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Volume Title: Economic and Financial Crises in Emerging Market Economies

Volume Author/Editor: Martin Feldstein, editor

Volume Publisher: University of Chicago Press

Volume ISBN: 0-226-24109-2

Volume URL: http://www.nber.org/books/feld03-1

Conference Date: October 19-21, 2000

Publication Date: January 2003

Title: Exchange Rate Regimes

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URL: http://www.nber.org/chapters/c9774

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Exchange Rate Regimes

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Exchange Rate Regimes, Capital Flows, and Crisis Prevention

1.1.1 Introduction

The emerging markets' financial crises of the 1990s had remarkable similarities.[1] Attracted by high domestic interest rates, a sense of stability stemming from rigid exchange rates, and what at the time appeared to be rosy prospects, large volumes of foreign portfolio funds moved into Latin America, East Asia, and Russia. This helped to propel stock market booms and to finance large current account deficits. At some point, and for a number of reasons, these funds slowed down or were reversed. This change in conditions required significant corrections in macroeconomics policies. Invariably, however, adjustment was delayed or was insufficient, increasing the level of uncertainty and the degree of country risk. As a result, massive volumes of capital left the country in question, international reserves dropped to dangerously low levels, and real exchange rates became acutely overvalued. Eventually the pegged nominal exchange rate had to be abandoned, and the country was forced to float its currency. In some cases—Brazil and

1. I am referring to the crises in Mexico (1997), East Asia (1997), Russia (1998), and Brazil (1999).

Russia are the clearest examples—a severe fiscal imbalance made the situation even worse.

Recent currency crises have tended to be deeper than in the past, resulting in steep costs to the population of the countries involved. In a world with high capital mobility, even small adjustments in international portfolio allocations to the emerging economies result in very large swings in capital flows. Sudden reductions in these flows, in turn, amplify exchange rate or interest rate adjustments and generate overshooting, further bruising credibility and unleashing a vicious circle. Two main policy issues have been emphasized in recent discussions on crisis prevention: First, an increasing number of authors have argued that in order to prevent crises, there is a need to introduce major changes to exchange rate practices in emerging economies. According to this view, emerging economies should adopt "credible" exchange rate regimes. A "credible" regime would reduce the probability of rumors-based reversals in capital flows, including what some authors have called have called "sudden stops." These authors have pointed out that the emerging economies should follow a "two-corners" approach to exchange rate policy: they should either adopt a freely floating regime or a super-fixed exchange rate system (Summers 2000). Second, a number of analysts have argued that the imposition of capital controls—and in particular controls on capital inflows—provides an effective way to reduce the probability of a currency crisis.

The purpose of this paper is to analyze, within the context of the implementation of a new financial architecture, the relationship between exchange rate regimes, capital flows, and currency crises in emerging economies. The paper draws on lessons learned during the 1990s and deals with some of the most important policy controversies that emerged after the Mexican, East Asian, Russian, and Brazilian crises. I also evaluate some recent proposals for reforming the international financial architecture that have emphasized exchange rate regimes and capital mobility. The rest of the paper is organized as follows: In section 1.1.2 I review the way in which economists' thinking about exchange rates in emerging markets has changed in the last decade and a half. More specifically, in this section I deal with four interrelated issues: (a) the role of nominal exchange rates as nominal anchors; (b) the costs of real exchange rate overvaluation; (c) strategies for exiting a pegged exchange rate; and (d) the death of middle-of-the-road exchange rate regimes as policy options. In section 1.1.3 I deal with capital controls as a crisis prevention device. In this section Chile's experience with market-based controls on capital inflows is discussed in some detail. Section 1.1.4 focuses on the currently fashionable view that suggests that emerging countries should freely float or adopt a super-fixed exchange rate regime (i.e., currency board or dollarization). In doing this I analyze whether emerging markets can adopt a truly freely floating exchange rate system, or whether, as argued by some analysts, a true floating system is not feasible in

less advanced nations. The experiences of Panama and Argentina with super-fixity, and of Mexico with a floating rate, are discussed in some detail. Finally, section 1.1.5 contains some concluding remarks.

1.1.2   Exchange Rate Lessons from the 1990s Currency Crises

The currency crises of the 1990s have led economists to rethink their views on exchange rate policies in emerging countries. Specifically, these crises have led many economists to question the merits of pegged-but-adjustable exchange rates, both in the short run—that is, during a stabilization program—and in the longer run. Indeed, the increasingly dominant view among experts is that, in order to prevent the recurrence of financial and currency crises, most emerging countries should adopt either freely floating or super-fixed exchange rate regimes. In this section I discuss the way in which policy thinking on exchange rates in emerging countries has evolved in the last decade and a half or so.

Nominal Anchors and Exchange Rates

In the late 1980s and early 1990s, and after a period of relative disfavor, rigid nominal exchange rates made a comeback in policy and academic circles. Based on time-consistency and political economy arguments, a number of authors argued that fixed, or predetermined, nominal exchange rates provided an effective device for guiding a disinflation program and for maintaining macroeconomic stability. According to this view, an exchange rate anchor was particularly effective in countries with high inflation—say, high two-digit levels—that had already tackled (most of) their fiscal imbalances. By imposing a ceiling on tradable prices, and by guiding inflationary expectations, it was said, an exchange rate nominal anchor would rapidly generate a convergence between the country's and the international rates of inflation. This view was particularly popular in Latin America and was behind major stabilization efforts in Argentina, Chile, and Mexico, among other countries. According to this perspective, a prerequisite for a successful exchange rate–based stabilization program was that the country in question had put its public finances in order before the program was implemented in full. This, indeed, had been the case in Chile in 1978–79 and Mexico during the late 1980s and early 1990s, when the so-called Pacto de Solidaridad exchange rate–based stabilization program was implemented (see Edwards and Edwards 1991; Aspe 1993).

However, a recurrent problem with exchange rate–based stabilization programs—and one that was not fully anticipated by its supporters—was that inflation tended to have a considerable degree of inertia. That is, in most episodes, domestic prices and wages continued to increase even after the nominal exchange rate had been fixed. In Edwards (1998c) I used data from the Chilean (1977–82) and Mexican (1988–94) exchange rate–based

stabilizations to analyze whether the degree inflationary persistence declined once the nominal exchange rate anchor program was implemented. My results suggest that, in both cases, the degree of persistence did not change significantly and remained very high. I attributed these results to two factors: a rather low degree of credibility of the programs, and, particularly in the case of Chile, the effects of a backward-looking wage-rate indexation mechanism.

If inflation is indeed characterized by a high degree of inertia, a fixed—or predetermined—nominal exchange rate will result in a real exchange rate appreciation and consequently in a decline in exports' competitiveness. Dornbusch (1997, 131) forcefully discussed the dangers of exchange rate anchors in his analysis of the Mexican crisis:

> Exchange rate–based stabilization goes through three phases: The first one is very useful . . . [E]xchange rate stabilization helps bring under way a stabilization . . . In the second phase increasing real appreciation becomes apparent, it is increasingly recognized, but it is inconvenient to do something . . . Finally, in the third phase, it is too late to do something. Real appreciation has come to a point where a major devaluation is necessary. But the politics will not allow that. Some more time is spent in denial, and then—sometime—enough bad news pile[s] up to cause the crash.

An additional complication is that under pegged exchange rates, negative external shocks tend to generate a costly adjustment process. Indeed, in a country with fixed exchange rates the optimal reaction to a negative shock—a worsening of the terms of trade or a decline in capital inflows, for example—is tightening monetary and fiscal policies until external balance is reestablished. A direct consequence of this is that, as a result of these negative shocks, economic activity will decline, and the rate of unemployment will tend to increase sharply. If the country is already suffering from a real exchange rate overvaluation, this kind of adjustment becomes politically difficult. More often than not, countries that face this situation will tend to postpone the required macroeconomics tightening, increasing the degree of vulnerability of the economy. Following this kind of reasoning, and after reviewing the fundamental aspects of the Mexican crisis, Sachs, Tornell, and Velasco (1995, 71) argue that it is "hard to find cases where governments have let the [adjustment process under fixed exchange rate] run its course." According to them, countries' political inability (or unwillingness) to live according to the rules of a fixed exchange rate regime reduces its degree of credibility.

In the mid-1990s, even as professional economists in academia and the multilateral institutions questioned the effectiveness of pegged-but-adjustable rates, policymakers in the emerging economies continued to favor that type of policies. In spite of Mexico's painful experience with a rigid

exchange rate regime in the first half of the 1990s, the five East Asian nations that eventually ran into a crisis in 1997 had a rigid—de facto, pegged, or quasi pegged—exchange rate system with respect to the U.S. dollar. Although this system worked relatively well while the U.S. dollar was relatively weak in international currency markets, things turned to the worse when, starting in mid-1996, the dollar began to strengthen relative to the Japanese yen. Naturally, as the dollar appreciated relative to the yen, so did those currencies pegged to it. Ito (2000, 280) has described the role of pegged exchange rates in the East Asian crisis in the following way:

> [T]he exchange rate regime was de facto dollar pegged. In the period of yen appreciation, Asian exporters enjoy high growth contributing to an overall high, economic growth, while in the period of yen depreciation, Asian economies' performance becomes less impressive . . . Moreover, the dollar peg with high interest rates invited in short-term portfolio investment. Investors and borrowers mistook the stability of the exchange rate for the absence of exchange rate risk.

In Russia and Brazil the reliance on rigid exchange rates was even more risky than in Mexico and in the East Asian nations. This was because in both Russia and Brazil the public-sector accounts were clearly out of control. In Russia, for example, the nominal deficit averaged 7.4 percent of gross domestic product (GDP) during the three years preceding the crisis. Worse yet, the lack of accountability during the privatization process, and the perception of massive corruption, had made international investors particularly skittish. In Brazil, the real plan, launched in 1994, relied on a very slowly moving preannounced parity with respect to the U.S. dollar. In spite of repeated efforts, the authorities were unable to rein in a very large fiscal imbalance. By late 1998 the nation's consolidated nominal fiscal deficit exceeded the astonishing level of 8 percent of GDP.

Real Exchange Rate Overvaluation: How Dangerous? How to Measure It?

The currency crises of the 1990s underscored the need to avoid overvalued real exchange rates—that is, real exchange rates that are incompatible with maintaining sustainable external accounts. In the spring 1994 meetings of the Brookings Institution Economics Panel, Rudi Dornbusch argued that the Mexican peso was overvalued by at least 30 percent and that the authorities should rapidly find a way to solve the problem. In that same meeting, Stanley Fischer, soon to become the International Monetary Fund's (IMF's) first deputy managing director, expressed his concerns regarding the external sustainability of the Mexican experiment. Internal U.S. government communications released to the U.S. Senate Banking Committee during 1995 also reflect a mounting concern among some U.S. officials. Several staff members of the Federal Reserve Bank of New York, for example,

argued that a devaluation of the peso could not be ruled out. For example, according to documents released by the U.S. Senate, on 27 October 1994 an unidentified Treasury staff member commented to Secretary Lloyd Bensten that "[rigid] exchange rate policy under the new Pacto [the tripartite incomes policy agreement between government, unions, and the private sector] could inhibit a sustainable external position" (D'Amato 1995, 308).

The overvaluation of the Mexican peso in the process leading to the 1994 currency crisis has been documented by a number of postcrisis studies. According to Sachs, Tornell, and Velasco (1996), for example, during the 1990–94 period the Mexican peso was overvalued, on average, by almost 29 percent (see their table 9). An ex post analysis by Ades and Kaune (1997), using a detailed empirical model that decomposed fundamentals' changes in permanent and temporary changes, indicates that by the fourth quarter of 1994 the Mexican peso was overvalued by 16 percent. According to Goldman Sachs, in late 1998 the Brazilian real was overvalued by approximately 14 percent. Moreover, although the investment houses did not venture to estimate the degree of misalignment of the Russian ruble, during the first half of 1997 there was generalized agreement that it had become severely overvalued.

The East Asian nations did not escape the real exchange rate overvaluation syndrome. Sachs, Tornell, and Velasco (1996), for instance, have argued that by late 1994 the real exchange rate picture in the East Asian countries was mixed and looked as follows: While the Philippines and Korea were experiencing overvaluation, Malaysia and Indonesia had undervalued real exchange rates, and the Thai baht appeared to be in equilibrium. Chinn (1998) used a standard monetary model to estimate the appropriateness of nominal exchange rates in East Asia before the crisis. According to his results, in the first quarter of 1997 Indonesia, Malaysia, and Thailand had overvalued exchange rates, whereas Korea and the Philippines were facing undervaluation.

After the Mexican and East Asian crises, analysts in academia, the multilaterals, and the private sector have redoubled their efforts to understand real exchange rate (RER) behavior in emerging economies. Generally speaking, the RER is said to be "misaligned" if its actual value exhibits a (sustained) departure from its long-run equilibrium. The latter, in turn, is defined as the RER that, for given values of "fundamentals," is compatible with the simultaneous achievement of internal and external equilibrium.[2] Most recent efforts to assess misalignment have tried to go beyond simple versions of purchasing power parity (PPP) and to incorporate explicitly the behavior of variables such as terms of trade, real interest rates, and productivity growth. Accordingly to a recently published World Bank book

2. For theoretical discussions on real exchange rates, see Frenkel and Razin (1987) and Edwards (1989).

(Hinkle and Montiel 1999), one of the most common methods for assessing real exchange rates is based on single-equation, time series econometric estimates. The empirical implementation of this approach is based on the following steps:

1. A group of variables that, according to theory, affect the RER is identified. These variables are called the RER fundamentals and usually include the country's terms of trade, its degree of openness, productivity differentials, government expenditure, foreign direct investment, and international interest rates.

2. Time series techniques are used to estimate an RER equation. The regressors are the fundamentals listed above. In most cases, an error correction model is used to estimate this equation.

3. The fundamentals are decomposed into a "permanent" and a "temporary" component. This is usually done by using a well-accepted statistical technique, such as the Hodrick-Prescott decomposition.

4. The permanent components of the fundamentals are inserted into the estimated RER equation. The resulting "fitted" time series is interpreted as the path through time of the *estimated equilibrium* RER.

5. Finally, the estimated equilibrium RER is compared to the actual RER. Deviations between these two rates are interpreted as misalignment. If the actual RER is stronger than the estimated equilibrium, the country in question is considered to face an RER overvaluation.

In the late 1990s Goldman Sachs (1997) implemented an RER model (largely) based on this methodology. The first version of this model, released in October of 1996—almost eight months before the eruption of the East Asian crisis—indicated that the RER was overvalued in Indonesia, the Philippines, and Thailand. Subsequent releases of the model incorporated additional countries and suggested that the Korean won and the Malaysian ringgit were also (slightly) overvalued. In mid-1997, Goldman Sachs introduced a new refined version of its model; according to these new estimates, in June of 1997 the currencies of Indonesia, Korea, Malaysia, the Philippines, and Thailand were overvalued, as were the currencies of Hong Kong and Singapore. In contrast, these calculations suggested that the Taiwanese dollar was undervalued by approximately 7 percent. Although, according to Goldman Sachs, in June 1997 the degree of overvaluation was rather modest in all five East Asian crisis countries, its estimates suggested that overvaluation had been persistent for a number of years: in Indonesia the RER had been overvalued since 1993, in Korea in 1988, in Malaysia in 1993, in the Philippines in 1992, and in Thailand since 1990 (see Edwards and Savastano 1999 for a review of other applications of this model for assessing RER overvaluation).

More recently, JPMorgan (2000) unveiled its own RER model. In an effort to better capture the dynamic behavior of RERs, this model went be-

yond the "fundamentals" and explicitly incorporated the role of monetary variables in the short run. In spite of this improvement, this model retained many of the features of the single-equation RER models summarized above and analyzed in greater detail in Edwards and Savastano (1999).

Although the methodology described above—and increasingly used by the multilateral institutions and investment banks—represents a major improvement over simple PPP-based calculations, it is still subject to some limitations. The most important one is that, as is the case in all residuals-based models, it assumes that the RER is, on average, in equilibrium during the period under study. This, of course, need not be the case. Second, this approach ignores the roles of debt accumulation and of current account dynamics. Third, the simpler applications of this model ignore the major jumps in the RER following a nominal devaluation. This, in turn, will tend to badly bias the results and to generate misleading predictions. A fourth shortcoming of these models is that they do not specify a direct relationship between the estimated equilibrium RER and measures of internal equilibrium, including the level of unemployment, or the relation between actual and potential growth. Fifth, many times this type of econometric-based analysis generates results that are counterintuitive and, more seriously perhaps, tend to contradict the conclusions obtained from more detailed country-specific studies (see Edwards and Savastano 1999 for a detailed discussion).

An alternative approach to evaluate the appropriateness of the RER at a particular moment in time consists of calculating the "sustainable" current account deficit, as a prior step to calculating the equilibrium RER. The simplest versions of this model—sometimes associated with the IMF—rely on (rather basic) general equilibrium simulations and usually do not use econometric estimates of an RER equation. Recently, Deutsche Bank (2000) used a model along these lines to assess RER developments in Latin America. According to this model, the sustainable level of the current account is determined, in the steady state, by the country's rate of (potential) GDP growth, world inflation, and the international (net) demand for the country's liabilities. If a country's actual current account deficit exceeds its sustainable level, the RER will have to depreciate in order to help restore long-run sustainable equilibrium. Using specific parameter values, Deutsche Bank (2000) computed both the sustainable level of the current account and the degree of RER overvaluation for a group of Latin American countries during early 2000. It is illustrative to compare the estimated degree of RER overvaluation according to the Goldman Sachs, JPMorgan, and Deutsche Bank models for a selected group of Latin American nations. This is done in table 1.1, where a positive (negative) number denotes overvaluation (undervaluation). These figures refer to the situation in March-April 2000. As may be seen, for some of the countries—Brazil being the premier example—the calculated extent of overvaluation varies significantly across models. The above discussion, including the results in table 1.1, re-

Table 1.1   **Alternative Estimates of Degree of Overvaluation in Selected Latin American Countries, March–April 2000 (%)**

Country	Goldman Sachs	JPMorgan	Deutsche Bank
Argentina	7	13	17
Brazil	–11	1	5
Chile	5	–8	0
Colombia	–4	0	10
Mexico	22	3	–2
Peru	–2	–5	5
Venezuela	44	9	n.a.

Sources: Goldman Sachs, "Latin America Economic Analyst" (March 2000). JPMorgan, "Introducing JPMorgan's Emerging Markets Real Exchange Rate Model" (3 April 2000). Deutsche Bank, "Latin America Current Accounts: Can They Achieve Sustainability?" (22 March 2000).

Note: n.a. = not available.

flects quite vividly the eminent difficulties in assessing whether a country's currency is indeed out of line with its long-term equilibrium. These difficulties are more pronounced under pegged or fixed exchange rate regimes than under floating exchange rate regimes.

On Optimal Exit Strategies

In the aftermath of the Mexican peso crisis, the notion that (most) exchange rate anchors eventually result in acute overvaluation prompted many analysts to revise their views on exchange rate policies. A large number of authors argued that in countries with an inflationary problem, after a short initial period with a pegged exchange rate, a more flexible regime should be adopted. This position was taken, for example, by Dornbusch (1997, 137), who, referring to lessons from Mexico, said, "crawl now, or crash later." The late Michael Bruno (1995, 282), then the influential chief economist at the World Bank, said that "[t]he choice of the exchange rate as the nominal anchor only relates to the initial phase of stabilization." Bruno's position was greatly influenced by his own experience as a policymaker in Israel, where, in order to avoid the overvaluation syndrome, a pegged exchange rate had been replaced by a sliding, forward-looking crawling band in 1989.

The view that a pegged exchange rate should only be maintained for a short period of time, while expectations are readjusted, has also been taken by Sachs, Tornell, and Velasco (1995), who argued that "[t]he effectiveness of exchange rate pegging is probably higher in the early stages of an anti-inflation program." Goldstein (1998, 51), maintained that "all things considered, moving toward greater flexibility of exchange rate at an early stage (before the overvaluation becomes too large) will be the preferred course of action."

In 1998 the IMF published a long study on "exit strategies," in which it set forward the conditions required for successfully abandoning a pegged ex-

change rate system (Eichengreen et al. 1998). This important document reached three main conclusions: (a) most emerging countries would benefit from greater exchange rate flexibility; (b) the probability of a successful exit strategy is higher if the pegged rate is abandoned at a time of abundant capital inflows; and (c) countries should strengthened their fiscal and monetary policies before exiting the pegged exchange rate. This document also pointed out that because most exits happened during a crisis, the authorities should devise policies to avoid "overdepreciation." An important implication of this document is that it is easier for countries to exit an exchange rate nominal anchor from a situation of strength and credibility than from one of weakness and low credibility. That is, the probability of a successful exit will be higher if after the exit, and under the newly floating exchange rate regime, the currency strengthens. In this case the authorities' degree of credibility will not be battered, as the exit will not be associated with a major devaluation and crisis, as has often been the case in the past. Chile and Poland provide two cases of successful exits into a flexible exchange rates in the late 1990s.

The most difficult aspect of orderly exits—and one that is not discussed in detail in the 1998 IMF document—is related to the political economy of exchange rates and macroeconomic adjustment. At the core of this problem is the fact that the political authorities tend to focus on short-term horizons and usually discount the future very heavily. This situation is particularly acute in the emerging economies, where there are no politically independent institutions with a longer time horizon. In many (but not all) industrial countries, independent central banks have tended to take the role of the longer perspective.[3]

Defining an appropriate exit strategy from a fixed exchange rate amounts, in very simple terms, to estimating the time when the marginal benefit of maintaining a pegged rate becomes equal to the marginal cost of that policy. As was pointed out above, the greatest benefit of a nominal exchange rate anchor is that it guides inflationary expectations down at the same time that it imposes a ceiling on tradable goods' prices. There is ample empirical evidence suggesting that these positive effects of a nominal anchor are particularly high during the early stages of a disinflation program (Kiguel and Liviatan 1995). As times goes by, however, and as inflation declines, these benefits will also decline. On the other hand, the more important cost of relying on an exchange rate nominal anchor is given by the fact that, in the presence of (even partial) inflationary inertia, the RER will become appreciated, reducing the country's degree of competitiveness. To the extent that the real appreciation is not offset by changes in fundamentals, such as higher productivity gains, the cost of the exchange rate anchor will tend to

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3. Interestingly enough, in the few emerging countries with an independent central bank, exchange rate policy tends to be in the hands of the ministry of finance. This was, for instance, the case of Mexico in 1994.
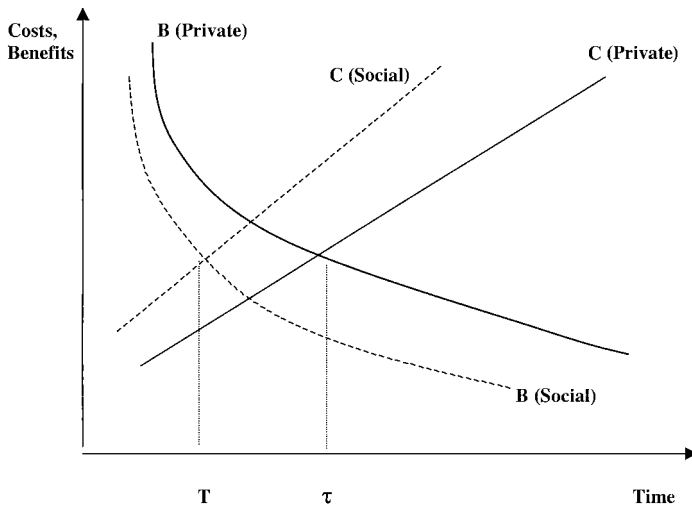
Fig. 1.1   Optimal exit: Private and social optimal timing

increase through time. Figure 1.1 provides a simple representation of this situation of declining benefits and increasing time-dependent costs of an exchange rate anchor (C denotes costs and B refers to benefits). The actual slopes of these curves will depend on structural parameters and on other policies pursued by the country. These include the country's degree of openness, expectations, the fiscal stance, and the degree of formal and informal indexation. In figure 1.1, the two schedules cross at time τ, which becomes the optimal exit time. Three important points should be noted. First, changes in the conditions faced by the country in question could indeed shift these schedules, altering the optimal exit time. Second, it is possible that, for a particular constellation of parameters, the two schedules do not intersect. Naturally, this would be the case where the optimal steady-state regime is a pegged exchange rate. Third, "private" cost and benefits will usually be different from "social" costs and benefits. That would be the case when, due to political considerations, the authorities are subject to "short-termism." In this case, benefits will tend to be overestimated and costs underestimated, resulting in a postponement of the optimal exit. Postponing the exit could—and usually does—result in serious costs, in the form of bankruptcies, major disruptions in economic activity, and, in some cases, the collapse of the banking system (Edwards and Montiel 1989).

The Death of Intermediate Exchange Rate Regimes
and the "Two-Corner" Approach

After the East Asian, Russian, and Brazilian crises, economists' views on nominal exchange rate regimes continued to evolve. Fixed-but-adjustable

regimes rapidly lost adepts, while the two extreme positions—super-fixed (through a currency board or dollarization), and freely floating rates—gained in popularity. This view is clearly captured by the following quotation from U.S. Secretary of the Treasury Larry Summers (2000, 8):

> [F]or economies with access to international capital markets, [the choice of the appropriate exchange rate regime] increasingly means a move away from the middle ground of pegged but adjustable fixed exchange rates toward the two corner regimes of either flexible exchange rates, or a fixed exchange rate supported, if necessary, by a commitment to give up altogether an independent monetary policy.

Summers goes on to argue, as do most supporters of the "two-corner" approach to exchange rate regimes, that this policy prescription "probably has less to do with Robert Mundell's traditional optimal currency areas considerations than with a country's capacity to operate a discretionary monetary policy in a way that will reduce rather than increase the variance in economic output" (9).

From a historical perspective the current support for the two-corner approach, is largely based on the shortcomings of the intermediate systems—pegged-but-adjustable, managed float, and (narrow) bands—and not on the historical merits of either of the two-corner systems. The reason for this is that in emerging markets there have been very few historical experiences with either super-fixity or with floating. Among the super-fixers, Argentina, Hong Kong, and Estonia have had currency boards and Panama has been dollarized.[4] This is not a large sample. Among floaters, the situation is not better. Mexico is one of the few countries with a somewhat long experience with a flexible rate (1995 to date), and most of it has taken place during periods of high international turmoil (see, however, the discussion in section 1.1.4 of this paper).

The IMF entered this debate in a rather guarded way. Eichengreen, Masson, Savastano, and Sharma (1999, 6) capture the Fund's view regarding exchange rate regimes quite vividly:

> Experience has shown that an adjustable peg or a tightly managed float with occasional large adjustments is a difficult situation to sustain under high capital mobility. . . . In an environment of high capital mobility, therefore, the exchange regime needs to be either a peg that is defended with great determination . . . or it needs to be a managed float where the exchange rate moves regularly in response to market forces.

Notice that, although these authors reject intermediate regimes, they fall considerably short of endorsing a free float. Indeed, in discussing the most

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4. Recently Ecuador has gone through a dollarization process, but it is too early to analyze the results of that reform. A number of smaller nations, however, have historically had currency boards. See the discussion in Hanke and Schuler (1994).

appropriate policy action in emerging economies, they argue that market forces should be supplemented with "some resistance from intervention and other policy adjustments" (6).

Current skepticism regarding pegged-but-adjustable regimes is partially based on the effect that large devaluations tend to have on firms' balance sheets and, thus, on the banking sector. As the experience of Indonesia dramatically showed, this effect is particularly severe in countries where the corporate sector has a large debt denominated in foreign currency.[5] Calvo (2001) has offered one of the very few theoretical justifications for ruling out middle-of-the road exchange rate regimes. He has argued that in a world with capital mobility and poorly informed market participants, emerging countries are subject to rumors, runs, and (unjustified) panics. This is because these uninformed participants may—and usually will—misinterpret events in the global market. This situation may be remedied, or at least minimized, by the adoption of a very transparent and credible policy stance. According to Calvo, only two types of regimes satisfy this requirement: super-fixes, and in particular dollarization, and a (very) clean float. In section 1.1.4 of this paper I discuss in great detail the most important issues related to this view.

It is important to note that although the two-corner solution has become increasingly popular in academic policy circles in the United States and Europe, it is beginning to be resisted in other parts of the world, and in particular in Asia. In the recently released report on crisis prevention, the Asian Policy Forum (2000, 4) has argued: "[T]he two extreme exchange rate regimes . . . are not appropriate for Asian economies. Instead, an intermediate exchange rate system that could mitigate the negative effects of the two extreme regimes would be more appropriate for most Asian economies."

1.1.3 Capital Flow Reversals, Capital Controls, and Exchange Rate Regimes

One of the fundamental propositions in recent debates on exchange rate regimes is that under free capital mobility, the exchange rate regime determines the ability to undertake independent monetary policy.[6] A (super) fixed regime implies giving up monetary independence, whereas a freely floating regime allows for a national monetary policy (Summers 2000). This idea has been associated with the so-called "impossibility of the Holy Trinity": it is not possible to simultaneously have free capital mobility, a pegged

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5. In 1982 Chile experienced the effects of a major devaluation on a corporate sector that was highly leveraged in foreign currency. For a thorough discussion of the case, see Edwards and Edwards (1991).

6. This, of course, is an old proposition dating back, at least, to the writings of Bob Mundell in the early 1960s. Recently, however, and as a result of the exchange rate policy debates, it has acquired renewed force.

exchange rate, and an independent monetary policy. Some authors have argued, however, that this is a false policy dilemma, since there is no reason that emerging economies have to allow free capital mobility. Indeed, the fact that currency crises are almost invariably the result of capital flow reversals has led some authors to argue that capital controls—and in particular controls on capital inflows—can reduce the risk of a currency crisis. Most supporters of this view have based their recommendation on Chile's experience with capital controls during the 1990s. Joe Stiglitz, the former World Bank chief economist, has been quoted by the *New York Times* (1 February 1998) as saying: "You want to look for policies that discourage hot money but facilitate the flow of long-term loans, and there is evidence that the Chilean approach or some version of it, does this." More recently, the Asian Policy Forum has explicitly recommended the control of capital inflows as a way of preventing future crises in the region. The Forum's policy recommendation number two reads as follows: "If an Asian economy experiences continued massive capital inflows that threaten effective domestic monetary management, it may install the capability to implement unremunerated reserve requirements (URR) and a minimum holding period on capital inflows" (page 5).

In this section I discuss in detail the most important aspect of the controls on capital inflows, and I evaluate Chile's experience with these policies.[7] More specifically, I focus on three issues: First, is there evidence that Chile's capital controls affected the composition of capital flows? Second, is there evidence that the imposition of these restrictions increased Chile's ability to undertake independent monetary policy? Third, did these controls help Chile reduce the degree of macroeconomic instability and vulnerability to externally originated shocks?[8]

Background

Chile introduced restrictions on capital inflows in June 1991.[9] Initially, all portfolio inflows were subject to a 20 percent reserve deposit that earned no interest. For maturities of less than a year, the deposit applied for the duration of the inflow, whereas for longer maturities, the reserve requirement was for one year. In July 1992 the rate of the reserve requirement was raised to 30 percent, and its holding period was set at one year, independently of the length of stay of the flow. Also, at that time its coverage was extended to trade credit and to loans related to foreign direct investment. New changes

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7. By now there are numerous pieces dealing with these issues. See, for example, Edwards (1999a,b), De Gregorio, Edwards, and Valdes (2000), and the literature cited therein.

8. Most analyses of the Chilean experience with controls on inflows also analyze their impact on real exchange rate dynamics. Due to space consideration, and because it is only a tangentially relevant issue, I do not deal with it in this paper. See, however, my discussion in Edwards (1998a).

9. Chile had had a similar system during the 1970s. See Edwards and Edwards (1991).

were introduced in 1995, when the reserve requirement coverage was extended to Chilean stocks traded in the New York Stock Exchange (ADRs), to financial foreign direct investment (FDI), and bond issues. In June of 1998, and as a way of fighting off contagion coming from the East Asian crisis, the rate of the reserve requirement was lowered to 10 percent, and in September of that year the deposit rate was reduced to zero. Throughout this period Chile also regulated FDI: until 1992, FDI was subject to a three-year minimum stay in the country; at that time the minimum stay was reduced to one year, and in early 2000 it was eliminated. There are no restrictions on the repatriation of profits from FDI.[10]

In 1991, when the capital controls policy was introduced, the authorities had three goals in mind: First, to slow down the volume of capital flowing into the country, and to tilt its composition toward longer maturities. Second, to reduce (or at least delay) the RER appreciation that stemmed from these inflows. Third, to allow the Central Bank to maintain a high differential between domestic and international interest rates. This, in turn, was expected to help the government's effort to reduce inflation to the lower single-digit level. It was further expected that the controls would reduce the country's vulnerability to international financial instability (Cowan and de Gregorio 1998; Massad 1998a; Valdés-Prieto and Soto 1998).

Chile's system of unremunerated reserve requirements (URRs) is equivalent to a tax on capital inflows. The rate of the tax depends on both the period of time during which the funds stay in the country and the opportunity cost of these funds. As shown by Valdés-Prieto and Soto (1998) and De Gregorio, Edwards, and Valdes (2000), the tax equivalent for funds that stay in Chile for k months is given by the following expression:

$$(1) \qquad \tau(k) = \left[\frac{r * \lambda}{(1 - \lambda)} \right] \left(\frac{\rho}{k} \right),$$

where $r*$ is an international interest rate that captures the opportunity cost of the reserve requirement, λ is the proportion of the funds that has to be deposited at the Central Bank, and ρ is the period of time (measured in months) that the deposit has to be kept in the Central Bank.

Figure 1.2 contains estimates of this tax equivalent for three values of k: six months, one year, and three years. Three aspects of this figure are particularly interesting: First, the rate of the tax is inversely related to the length of stay of the funds in the country. This, of course, was exactly the intent of the policy, because the authorities wanted to discourage short-term inflows. Second, the rate of the tax is quite high even for a three-year period. During 1997, for example, the average tax for three-year funds was 80 basis points. Third, the tax equivalent has varied through time, both because the

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10. Parts of this section rely on my previous work on the subject. See also the discussion by Massad (1998a).
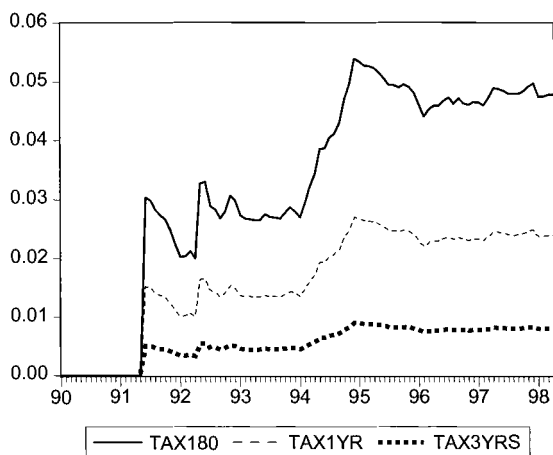
Fig. 1.2   Tax equivalent of capital controls: Stay of 180 days, 1 year, 3 years

rate of the required deposit was altered and because the opportunity cost has changed.

Capital Controls and the Composition of Capital Inflows in Chile

In table 1.2 I present data, from the Central Bank of Chile, on the composition of capital inflows into Chile between 1988 and 1998. As may be seen, during this period shorter-term flows—that is, flows with less than one-year maturity—declined steeply relative to longer-term capital. The fact that this change in composition happened immediately after the implementation of the policy provides some support for the view that by restricting capital mobility, the authorities indeed affected their composition. These data also show that, with the exception of a brief decline in 1993, the total volume of capital inflows into the country continued to increase until 1998. In constructing the figures in table 1.2, the Central Bank of Chile classified inflows as short term or long term on the basis of *contracted* maturity. It is possible to argue, however, that when measuring a country's degree of vulnerability to financial turmoil what really matters is residual maturity, measured by the value of the country's liabilities in the hands of foreigners that mature within a year. Table 1.3 presents data, from the Bank of International Settlements, on residual maturity for loans extended by Group of Ten (G10) banks to Chile and a group of selected of Latin American and East Asian countries. The results are quite revealing. First, once residual maturity is used, the percentage of short-term debt does not look as low as when contracting maturities are considered. Second, the figures in table 1.3 indicate that in late 1996 Chile had a lower percentage of short-term debt to G10 banks than any of the East Asian countries, with the exception of Malaysia. Third, although by end 1996 Chile had a relatively low percent-

Table 1.2   **Capital Inflows (Gross) to Chile (US$ millions)**

Year	Short-Term Flows	% of Total	Long-Term Flows	% of Total	Total	Deposits
1988	916,564	96.3	34,838	3.7	951,402	n.a.
1989	1,452,595	95.0	77,122	5.0	1,529,717	n.a.
1990	1,683,149	90.3	181,419	9.7	1,864,568	n.a.
1991	521,198	72.7	196,115	27.3	717,313	587
1992	225,197	28.9	554,072	71.1	779,269	11,424
1993	159,462	23.6	515,147	76.4	674,609	41,280
1994	161,575	16.5	819,699	83.5	981,274	87,039
1995	69,675	6.2	1,051,829	93.8	1,121,504	38,752
1996	67,254	3.2	2,042,456	96.8	2,109,710	172,320
1997	81,131	2.8	2,805,882	97.2	2,887,013	331,572

Notes: Deposits in the Central Bank of Chile are due to reserve requirements. n.a. = not applicable.

Table 1.3   **Ratio of Short-Term Bank Loans to Total Bank Loans (%)**

	Mid-1996	End 1996	Mid-1997	End 1997	Mid-1998
Argentina	53.4	56.3	54.2	57.7	57.4
Brazil	57.7	63.0	62.6	64.3	62.6
Chile	**57.7**	**51.2**	**43.3**	**50.4**	**45.9**
Colombia	45.9	39.3	39.4	40.0	39.6
Mexico	47.8	44.7	45.5	43.7	44.9
Peru	78.3	79.2	67.0	69.3	75.7
Indonesia	60.0	61.7	59.0	60.6	55.0
Korea	70.8	67.5	68.0	62.8	45.8
Malaysia	49.7	50.3	56.4	52.7	48.6
Taiwan	86.4	84.4	87.3	81.6	80.1
Thailand	68.9	65.2	65.7	65.8	59.3

Source: The Bank for International Settlements.

age of short-term residual debt, it was not significantly lower than that of Argentina, a country with no capital restrictions, and it was higher than that of Mexico, another Latin American country without controls. Fourth, Chile experienced a significant reduction in its residual short-term debt between 1996 and 1998.

A number of authors have used regression analysis to investigate the determinants of capital flows in Chile and to determine whether the controls on inflows have indeed affected the composition of these flows. Soto (1997) and De Gregorio, Borenzstein, and Lee (1998), for example, have used vector autoregression analysis on monthly data to analyze the way in which capital controls have affected the composition of capital inflows. Their results confirm the picture presented in tables 1.2 and 1.3 and suggest that the tax on capital movements discouraged short-term inflows. These early studies suggest, however, that the reduction in shorter-term flows was fully com-

pensated by increases in longer-term capital inflows and that, consequently, aggregate capital moving into Chile was not altered by this policy. Moreover, Valdés-Prieto and Soto (1996) have argued that the controls only became effective in discouraging short-term flows after 1995, when the tax-equivalent rate of the deposits had increased significantly.

In a recent study, De Gregorio, Edwards, and Valdes (2000) use a new data set to evaluate the effects of the URR on the volume and composition of capital inflows into Chile. Using semistructural vector autoregressions (VARs), the authors conclude that this policy affected negatively, and quite strongly, short-term flows. More specifically, they estimated that the presence of the URR implied that, on average, quarterly short-term flows were between 0.5 and 1.0 percentage points of GDP below what they would have been otherwise. Their results for total flows, however, show that the capital controls policy had not had a significant effect on this aggregate variable.

A traditional shortcoming of capital controls (either on outflows or inflows) is that it is relatively easy for investors to avoid them. Valdés-Prieto and Soto (1998), for example, have argued that in spite of the authorities' efforts to close loopholes, Chile's controls have been subject to considerable evasion. Cowan and De Gregario (1997) acknowledged this fact and constructed a subjective index of the "power" of the controls. This index takes a value of 1 if there is no (or very little) evasion and takes a value of zero if there is complete evasion. According to these authors, this index reached its lowest value during the second quarter of 1995; by late 1997 and early 1998 this index had reached a value of 0.8.

Capital Controls and Monetary Policy in Chile

One of the alleged virtues of Chile-style capital controls is that, in the presence of pegged exchange rates, they allow the country in question greater control over its monetary policy. That is, in the presence of controls, the local monetary authorities will have the ability to affect domestic (short-) term interest rates. In fact, this greater control over monetary policy has been one of the reasons given in support of the imposition of this type of controls in the Asian nations (Asian Policy Forum 2000).

A small number of studies has used Chilean data to look empirically at this issue. Using a VAR analysis, De Gregorio, Borenzstein, and Lee (1998) and Soto (1997) found that an innovation to the tax had a positive and very small short-term effect on indexed interest rates. In Edwards (1998b), I used monthly data to analyze whether, after the imposition of the controls (and after controlling for other variables), there was an increase in the differential between dollar- and peso-denominated interest rates (properly adjusted by expected devaluation). I tested this proposition by using rolling regressions to estimate the parameters of an AR(1) process for the interest rate differential. I found out that, although the steady-state interest rate differential had actually declined after the imposition of the controls in 1991, it

had become more sluggish.[11] That is, after the imposition of the controls—and in particular after their tightening in 1993—it took a longer period of time for interest rate differentials to decline until they reached their steady-state equilibrium. I interpreted this evidence as suggesting that the controls had indeed increased Chile's control over short-run monetary policy. These results largely confirmed those obtained by Laurens and Cardoso (1998).

De Gregorio, Edwards, and Valdes (2000) have recently used monthly data to estimate a series of semistructural VARs. Their main interest was to analyze the way in which a shock to the URR tax equivalent affects a number of macroeconomic variables. In addition to the tax equivalent of the controls, their analysis included the following endogenous variables: domestic (indexed) interest rates;[12] a proxy for the expected rate of depreciation; short- and long-term capital flows; and RER-effective depreciation. In addition, they introduced the six-month Libor interest rate and the JP-Morgan Emerging Markets Bond Index. The results obtained from this analysis suggest that in response to a 1–standard deviation shock to the tax equivalent of the capital controls affected domestic interest rates positively. The effect, however, is quantitatively small—between 10 and 25 basis points—and peaked after six months. This means that the capital controls policy did help Chile's monetary authorities' efforts to target short-term domestic interest rates without unleashing a vicious circle of higher rates followed by higher capital inflows, monetary sterilization, and even higher domestic interest rates.

Controls on Capital Inflows, External Vulnerability, and Contagion

From a crisis prevention perspective, a particularly important question is whether Chile-style controls on inflows reduce financial vulnerability and, thus, lower the probability of a country's being subject to contagion. At a more specific historical level, the question is whether Chile was spared from financial contagion during the period when the controls on capital inflows were in effect (1991–98). In particular, did these controls isolate Chile's key macroeconomics variables—and especially domestic interest rates—from externally generated financial turmoil? In panel A of figure 1.3 I present weekly data on the evolution of Chile's ninety-day deposit interest rates for 1996–99.[13] This figure provides a very interesting (preliminary) picture of the way in which Chile's domestic financial market reacted to externally generated disturbances. The most salient aspects of this figure are

11. The decline in the steady-state interest rate differential was attributed to the reduction of Chile's country risk premium.

12. For more than thirty years Chile's financial sector has operated on the bases of inflation-adjusted, or indexed, interest rates. The vast majority of financial transactions of maturities in excess of thirty days are documented in Chile's unit of account, the *Unidad de Fomento* (UF).

13. Although the data for thirty-day rates refer to nominal rates, those for ninety-day deposits are in Chile's "real" (inflation-corrected) unit of account.
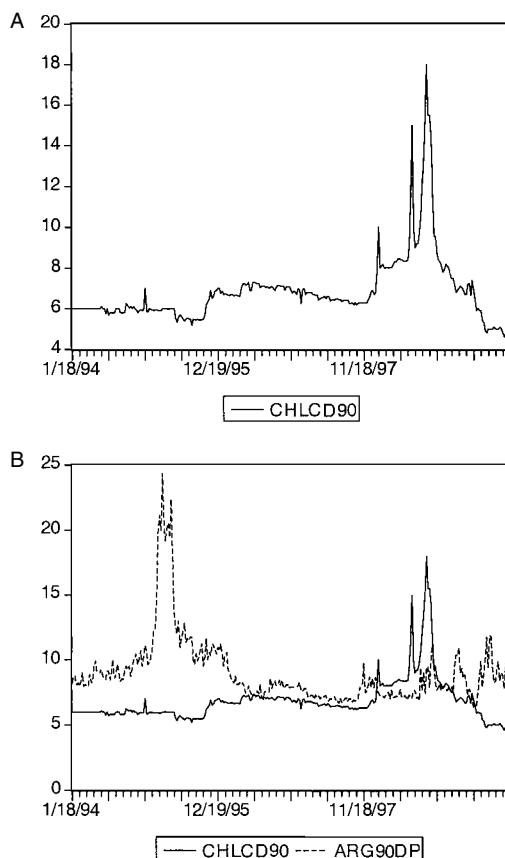
Fig. 1.3   *A,* **Chile nominal interest rates;** *B,* **Comparative rates with Argentina**

- Chile's domestic interest rates reacted very mildly to the Mexican crisis of December 1994. In fact, as may be seen from the figure, there was a very short-lived spike in January of 1995. During the rest of that year—and at a time when most of Latin America was suffering from the so-called Tequila effect—Chile's interest rates remained low and stable. The tranquility in Chile's financial markets at the time is captured clearly in panel B of figure 1.3, where interest rates in Chile and Argentina are depicted (notice Argentina did not have any form of capital controls during this period).
- Until late 1997—that is, even after the Asian crisis erupted—Chile's interest rates continued to be low and relatively stable. Indeed, this great stability in domestic interest rates between 1994 and the first ten months of 1997 contributed greatly to the notion that Chile's controls on capital inflows had been instrumental in reducing the country's degree of vulnerability.

- Throughout the October 1997–September 1998 period, and in spite of the presence of the controls, Chile's domestic interest rates were subject to massive increases. These jumps were largely in response to increased financial turmoil in Asia and to the Russian default of August 1998 and took place in spite of the fact that during this time the controls were tightened.
- Paradoxically, perhaps, financial stability in Chile returned in the last quarter of 1999, *after* the controls had been reduced to zero.

Figure 1.3, on Chile's domestic interest rates behavior, suggests that during the second half of the 1990s there was structural change in the process generating this interest rates. More specifically, it appears that around 1997–98 there was a break in the relationship between Chile's interest rates and emerging countries' risk premia. Although during the early years Chile's domestic financial market was not subject to contagion, the situation appears to have changed quite drastically in 1997–98. What makes this particularly interesting is that this apparent structural break that increased Chile's vulnerability to external disturbances took place at a time when the authorities were *expanding* the coverage of the controls on inflows (see De Gregorio, Edwards, and Valdes 2000 for details).

In order to investigate this issue formally, I analyzed the way in which Chile's interest rates responded to shocks to the emerging markets' "regional" risk premium, as measured by the cyclical component of JPMorgan's EMBI index for non–Latin American countries. I estimated a series of VAR systems using weekly data for a number of subperiods spanning 1994–99.[14] The following endogenous variables were included in the estimation:

1. The cyclical component of the non–Latin American emerging markets' JPMorgan EMBI index.[15] An increase in this index reflects a higher market price of (non–Latin American) emerging markets' securities and, thus, a reduction in the perceived riskiness of these countries. Given the composition of the EMBI index, this indicator mostly captures the evolution of the market perception of "country risk" in Asia and Eastern Europe.[16]

2. The cyclical component of the Latin American emerging markets' JPMorgan EMBI index.

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14. The use of weekly data permits us to interpret the interest rates' impulse response function to a "regional risk" shock in a structural way. This interpretation requires that changes in domestic interest rates not be reflected in changes in the non–Latin American EMBI index during the same week. In the case of Chile, this is a particularly reasonable assumption, because during most of the period under consideration Chilean securities were not included in any of the emerging market EMBI indexes. The period was chosen in order to exclude the turmoil generated two major crises. For comparative purposes I estimated similar VARs for Argentina and Mexico.

15. The cyclical component was calculated by subtracting the Hodrick-Prescott filter to the index itself.

16. Details on the index can be found in JPMorgan's website.

3. The weekly rate of change in the Mexican peso–U.S. dollar exchange rate.

4. The weekly rate of change in the Chilean peso–U.S. dollar exchange rate.

5. The spread between ninety-day peso and U.S. dollar–denominated deposits in Argentina. This spread is considered as a measure of the expectations of devaluation in Argentina.

6. Argentine ninety-day, peso-denominated deposit rates.

7. Mexican ninety-day, certificate of deposit nominal rates expressed in pesos.

8. Chilean ninety-day deposit rates in domestic currency.[17]

In addition, interest rates on U.S. thirty-year bonds were included as an exogenous variable. All the data were obtained from the Datastream data set. In the estimation a two-lag structure, which is suggested by the Schwarz criteria, was used. In determining the ordering of the variables for the VAR estimation, I considered the (cyclical component of the) EMBI index for non–Latin American emerging markets, and the EMBI for Latin American countries to be, in that order, the two most exogenous variables. The results obtained indicate that Chile's domestic interest rates were affected significantly by financial shocks from abroad. One–standard deviation positive (negative) shock to the non–Latin American EMBI index generates a statistically significant decline (increase) in Chile's domestic interest rates. This effect peaks at 30 basis points after three weeks and dies off after seven weeks.

This exercise also suggests that domestic interest rates in Argentina and Mexico were significantly affected by shocks to the non–Latin American EMBI index. Generally speaking, then, this analysis provides some preliminary evidence suggesting that shocks emanating from other emerging regions were transmitted to the Latin nations in a way that is independent of the existence of controls on capital inflows.

In order to analyze whether the relationship determining Chile's domestic interest rates experienced a break point in the second half of the 1990s, I compared the error variance decomposition for Chile's interest rates for two subperiods. The first subperiod extends from the first week of 1994 through the last week of 1996, whereas the second subperiod covers the first week of 1997 through the last week of October 1999. That is, the first subperiod includes only the Mexican crisis, whereas the second subperiod covers the East Asian, Russian, and Brazilian crises. The results obtained indeed suggest the existence of an important structural break: during the first subperiod the EMBI indexes explained less than 1 percent of the variance

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17. As pointed out above, these deposit rates are expressed in "real" pesos. That is, they are in terms of Chile's inflation-adjusted unit of account, the so-called UF. During the period under study, Chile did not have a deep market for nominal ninety-day deposits.

of Chile's interest rates; during the second subperiod, however, these two indexes explained almost 25 percent of this variance. These results, then, indicate that toward late 1997 the effectiveness of capital controls in shielding Chile from external disturbances had diminished significantly.

Overall, my reading of Chile's experience with controls on inflows is that they were successful in changing the maturity profile of capital inflows and of the country's foreign debt. Also, the controls allowed the monetary authority to have greater control over monetary policy. This effect, however, appears to have been confined to the short run and was not very important quantitatively. The evidence—and, in particular, the new results reported above—suggests that Chile was vulnerable to the propagation of shocks coming from other emerging markets. Moreover, these results indicate that in late 1997, six years after having controls on capital inflows put in place, the relationship between domestic interest rates and emerging markets' risk experienced a significant structural break that resulted in the amplification of externally originated shocks. In light of this evidence, my view is that although Chile-style controls on inflows may be useful, it is important not to overemphasize their effects. In countries with well-run monetary and fiscal policies, controls on inflows will tend to work, having a positive effect. However, in countries with reckless macroeconomic policies, controls on inflows will have little if any effect. It is important to emphasize that even in well-behaved countries, Chile-style controls on inflows are likely to be useful as a short-run tool that will help implement an adequate sequencing of reform. There are, however, some costs and dangers associated with this policy. First, as emphasized by Valdés-Prieto and Soto (1998) and De Gregorio, Edwards, and Valdes (2000), among others, they increase the cost of capital, especially for small and midsize firms. Second, there is always the temptation to transform these controls into a permanent policy. Third, and related to the previous point, in the presence of capital controls there is a danger that policymakers and analysts will become overconfident, neglecting other key aspects of macroeconomic policy.[18] This, indeed, was the case of Korea in the period leading to its crisis. Until quite late in 1997, international analysts and local policymakers believed that, due to the existence of restrictions on capital mobility, Korea was largely immune to a currency crisis—so much so that, after giving the Korean banks' and central bank's stance the next-to-worst ratings, Goldman Sachs argued that because Korea had "a relatively closed capital account," these indicators should be excluded from the computation of the overall vulnerability index. As a consequence of this, during most of 1997 Goldman Sachs played down the extent of Korea's problems. If, however, it had (correctly) recognized that capital restrictions cannot truly protect an economy from financial weaknesses, Goldman Sachs would have

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18. This point has been emphasized by Fraga (1999).

clearly anticipated the Korean debacle, as it anticipated the Thai meltdown.

1.1.4   To Freely Float or to Super-Fix: Is That the Question?

As pointed out in section 1.1.2, an increasingly large number of analysts agrees that, in a world of high capital mobility, middle-of-the-road exchange rate regimes—that is, pegged-but-adjustable and its variants—are prone to generate instability, increasing the probability of a currency crisis. As a result of this view, the so-called two-corner perspective on exchange rate regimes has become increasingly popular. Generally speaking, whether a particular country should adopt a super-fixed or a floating system will depend on its specific structural characteristics, including the degree of de facto dollarization of the financial system, the extent of labor market flexibility, the nature of the pass-through coefficient(s), and the country's inflationary history (Calvo 1999). In this section I discuss, in some detail, some experiences with super-fixed and floating exchange rate regimes in emerging economies. The section is organized in three parts: I first review some of the few experiences with super-fixed regimes—Argentina, Hong Kong, and Panama. Although the analysis is not exhaustive and does not cover every angle of these countries' experiences, it deals with some of the more salient, and less understood, aspects of these regimes. I then deal with the feasibility of floating rates in emerging economies. I do this from the perspective of what has become to be known as "fear of floating," or the emerging countries' alleged proclivity to intervene in the foreign exchange market (Reinhart 2000). My analysis of the feasibility of freely floating rates relies heavily on Mexico's experience with floating rates since 1995. In particular, I address three specific issues: (a) Has Mexico's exchange rate been "excessively volatile" since the peso was floated? (b) To what extent have exchange rate movements affected the conduct of Mexico's monetary policy (that is, can we identify a monetary feedback rule)? (c) What has been the relationship between exchange rate and interest rate movements?

Super-Fixed Exchange Rate Regimes: Myths and Realities

Supporters of super-fixed regimes—currency boards and dollarization—have argued that these exchange rate systems provide credibility, transparency, very low inflation, and monetary and financial stability (Calvo 1999, Hanke and Schuler 1998, Hausmann 2000). A particularly attractive feature of super-fixed regimes is that, in principle, by reducing speculation and devaluation risk, they make domestic interest rates lower and more stable than under alternative regimes.

If, as Calvo (1999) has conjectured, the nature of external shocks is not independent of the exchange rate regime, and countries with more credible regimes face milder shocks, super-fixed economies will tend to be less prone
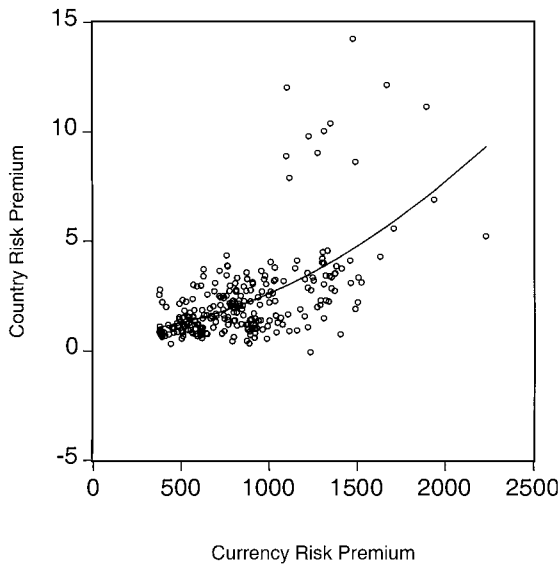
Fig. 1.4   Currency versus country risk premiums: Argentina, 1994–99

to contagion and thus will tend to have lower and more stable interest rates. This, combined with enhanced credibility and financial stability, will, in turn, result in an environment that will be more conducive to long-term growth. This argument would be greatly reinforced if the different risk premiums, and in particular the currency and country premiums, are related among themselves. Indeed, if this is the case a lower exchange rate risk will be translated into a lower country risk premium and a lower cost of capital for the country in question. In figure 1.4 I use weekly data, from 1994 through the end of 1999, to plot Argentina's currency risk premium—measured as the spread between peso- and dollar-denominated deposit rates—against Argentina's country risk premium, measured as the spread of the country's par Brady bonds. As may be seen, this diagram does suggest that these two risk premiums have been positively related.

Even for countries with a super-fixed exchange rate regime achieving credibility is not automatic, however. For this type of regime actually to be credible, some key issues have to be addressed successfully:

- Fiscal solvency. In the stronger version of super-fixed *models* this is taken care of almost automatically, because the authorities understand that they have no alternative but to run a sustainable fiscal policy. This is because the authorities are aware of the fact that the traditional recourse of reducing the real value of the public debt through a surprised devaluation is no longer available. This imposed fiscal responsibility is, in fact, considered to be one of the most positive aspects of the super-

fixed regime. However, for the system to be efficient the fiscal require-
ment also has to include specific operational aspects, including the in-
stitutional ability to run countercyclical fiscal policies.

- The lender-of-last-resort function, which under flexible and pegged-
  but-adjustable regimes is provided by the central bank, has to be dele-
  gated to some other institution. This may be a consortium of foreign
  banks, with which a contingent credit is contracted, a foreign country
  with which a monetary treaty has been signed, or a multilateral insti-
  tution.
- Related to the previous point, in a super-fixed regime the domestic
  banking sector has to be particularly solid in order to minimize the fre-
  quency of banking crises. This can be tackled in a number of ways, in-
  cluding implementing appropriate supervision, imposing high liquid-
  ity requirements on banks, or having a major presence of first-rate
  international banks in the domestic banking sector.
- Currency board regimes require that the monetary authority hold
  enough reserves, an amount that, in fact, exceeds the monetary base.
  Whether the authorities should hold large reserves under dollarization
  is still a matter of debate. What is clear, however, is that dollarization
  does not mean that the holding of reserves should be zero. In fact, it
  may be argued that in this context, international reserves are an im-
  portant component of a self-insurance program.

According to models in the Mundell-Fleming tradition—including some
modern versions, such as Chang and Velasco (2000)—a limitation of super-
fixed regimes is that negative external shocks tend to be amplified. More-
over, to the extent that it is difficult to engineer relative price changes, these
external shocks will have a tendency to be translated into financial turmoil,
economic slowdown, and higher unemployment. The actual magnitude of
this effect will, again, depend on the structure of the economy and, in par-
ticular, on the degree of labor-market flexibility. Some authors have recently
argued, however, that these costs have been exaggerated and that, in fact,
relative price changes between tradable and nontradable goods can be
achieved through "simulated devaluations," including the simultaneous im-
position of (uniform) import tariffs and export subsidies.[19] Calvo (1999, 21)
has gone so far as to argue that the existence of nominal price rigidity may
be a blessing in disguise, because it allows adjustment in profits to occur
slowly, smoothing the business cycle.

19. See Calvo (1999). From a practical perspective, however, there are important limits to
this option. In particular, it will violate World Trade Organization regulations. Additionally,
the use of commercial policy to engineer relative price adjustments will have serious political
economy implications. On the equivalence of this type of commercial policy package and ex-
change rate adjustments, see Edwards (1988, 31–32).

Argentina's Currency Board

Argentina provides one of the most interesting (recent) cases of a super-fixed regime. In early 1991, and after a long history of macroeconomics mismanagement, two bouts of hyperinflation, and depleted credibility, Argentina adopted a currency board. This program, which was led by Ministry of Economics Domingo Cavallo, was seen by many as a last-resort measure for achieving credibility and stability. After a rocky start—including serious contagion stemming from the Mexican crisis in 1995—the new system became consolidated during the year 1996–97. Inflation plummeted, and by 1996 it had virtually disappeared; in 1999 and 2000 the country, in fact, faced deflation. At the time Argentina adopted a currency board, the public had largely lost all confidence in the peso. In fact, by the late 1980s the U.S. dollar had become the unit of account, and a very large number of transactions was documented and carried on in dollars.

In Argentina, the lender-of-last-resort issue has been addressed in three ways. First, banks are required to hold a very high "liquidity requirement." Second, the Central Bank has negotiated a substantial contingent credit line with a consortium of international banks. Third, there has been a tremendous increase in international banks' presence: seven of Argentina's eight largest banks are currently owned by major international banks.[20]

After the adoption of the currency board and the rapid decline in inflation, the country experienced a major growth recovery, posting solid rates of growth in 1991–94. In 1995, however, and largely as a consequence of the Mexican Tequila crisis, the country went into a severe recession, with negative growth of 3 percent. It recovered in 1996–97, only to fall once again into a recession in 1998–99, this time affected by the Russian and Brazilian currency crises and by increasing doubts about the country's ability to deal with its fiscal and external problems. In 1999 GDP contracted by almost 4 percent, and in 2000 it posted modest growth. The combination of these external shocks and some structural weaknesses—including an extremely rigid labor legislation—resulted in a very high rate of unemployment. It exceeded 17 percent in 1995–96, and it has averaged almost 15 percent during 1999–2000.

Contrary to the simplest version of the model, exchange rate risk did not disappear after Argentina adopted a currency board. This is illustrated in figure 1.5, where a weekly time series of interest rate differential between peso- and dollar-denominated thirty-day deposits paid by Argentine banks from 1993 through October 1999 is presented. As may be seen, this differential experienced a major jump immediately after the Tequila crisis, exceeding 1,400 basis points. Although it subsequently declined, it continued to be very high and volatile. During the first ten months of 1999, for ex-

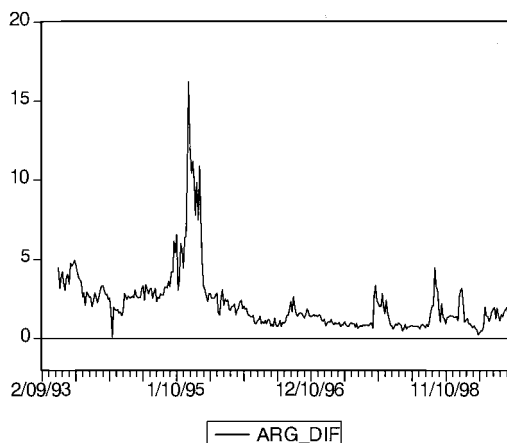20. These eight banks, in turn, account for approximately 50 percent of deposits.

Fig. 1.5   Argentina, interest rate differential between peso- and dollar-denominated deposits (weekly data, 1993–99)
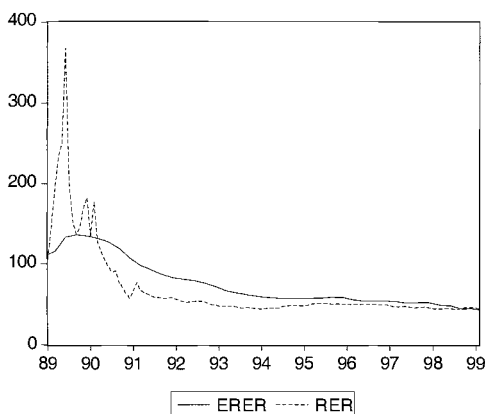

Fig. 1.6   Argentina: Equilibrium and actual trade-weighted real exchange rates, 1985–99 (Goldman Sachs estimates)

ample, the thirty-day peso-dollar interest rate differential averaged 140 basis points.

Since 1996, Argentine (real) domestic interest rates have been relatively high and volatile. Indeed, and as may be seen in figure 1.6, since 1997 the ninety-day deposit rate in Argentina has been higher, on average, than in Chile, a country that has followed a policy of increased exchange rate flexibility. This figure also shows that, except for a short period in 1998, Argentina's ninety-day interest rates have been more volatile than Chile's equivalent rates. Furthermore, during the last three months of 1999 and most of 2000, Argentine real interest rates exceeded those in Mexico, the

Latin American country with the longest experience with floating rates (see the next subsection for a discussion of Mexico). In the last few years, and even after the currency board had been consolidated, Argentina's country risk—measured, for example, by the spread of its Brady Bonds—has also been high and volatile.

Vulnerability and Contagion. As noted above, supporters of super-fixed regimes have argued that to the extent that the regime is credible, the country in question will be less vulnerable to external shocks and contagion. This proposition is difficult to test, since it is not trivial to build an appropriate counterfactual. What can be done, however, is to compare the extent to which countries that are somewhat similar—except for the exchange rate regime—are affected by common international shocks. Such an exercise was described in section 1.1.3 of this paper for the case of domestic interest rates in Argentina, Chile, and Mexico. The results obtained clearly indicate that a 1–standard deviation shock to Latin America's regional risk premium affected Argentina's domestic interest rates significantly. Also, in a recent five-country study on the international transmission of financial volatility using switching ARCH techniques, Edwards and Susmel (2000) found that Argentina has been the country most seriously affected by volatility contagion: the other countries in the study are Brazil, Chile, Mexico, and Hong Kong. Interestingly enough, this study also found that Hong Kong, the most revered of the super-fixers, has also been subject to important volatility contagion during the last five years.

Competitiveness, Fiscal Policy, and Credibility. Analysts have emphasized two factors as possible explanations for Argentina's financial instability during the last few years: an accumulated RER overvaluation and an inability to bring the fiscal accounts under control.

Figure 1.6 presents Goldman Sachs' estimation of Argentina's equilibrium RER as well as its actual (trade-weighted) RER for 1985–99.[21] In this figure, if the equilibrium RER exceeds the actual RER, the currency is overvalued. As may be seen, according to these calculations, Argentina suffered a significant overvaluation until early 1999. Independently of the actual relevance and accuracy of these specific estimates, the belief that Argentina had accumulated a significant RER disequilibrium had a negative effect on expectations and the regime's degree of credibility.

Since 1996 Argentina has run increasingly larger fiscal deficits and has systematically exceeded its own—and successive IMF programs'—deficit targets. This has resulted in a rapidly growing public-sector debt and in swelling external financing requirements. These two factors, plus the slow

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21. This equilibrium RER is estimated using a method similar to the one discussed in section 1.1.2 of this paper. For details see Ades and Kaune (1998).

progress in key structural reform areas, such as labor-market legislation and the relationship between the provinces and the federal government, have translated into successive bouts of low credibility and instability.

Panama and Dollarization

In 1998 many analysts and politicians, including Argentina's President Carlos Menem, concluded that Argentina's credibility problems could be tackled by taking an additional step toward exchange rate super-fixity and adopting the U.S. dollar as the sole legal tender. Supporters of this dollarization project pointed to Panama's remarkably low inflation as living proof of the merits of that system. What was surprising, however, was that this early support for dollarization was not based on a serious evaluation of the Panamanian case. More specifically, what admirers of this experience did not know—or did not say—was that Panama's monetary arrangement has survived largely thanks to IMF support. In effect, with the exception of a brief interregnum during the Noriega years, Panama has been almost permanently under the tutelage of the fund. Since 1973 Panama has had sixteen IMF programs, the most recent of which was signed in late 1997, and is expected to run until late 2000. According to Mussa and Savastano (2000), during the last quarter of a century Panama has been the most assiduous user of IMF resources in the western hemisphere; since 1973, only Pakistan has had a larger number of IMF programs. The main factor behind this proliferation of IMF programs has been Panama's inability, until very recently, to control its public finances. Between 1973 and 1998 the fiscal deficit averaged 4 percent of GDP, and during 1973–87—a period of continuous IMF programs—it exceeded a remarkable 7 percent of GDP. In fact, it has only been in the last few years that Panama has been able to put its fiscal accounts in order.

In 1904 Panama adopted the dollar as legal tender. Although there is a national currency, the balboa, its role is largely symbolic. There is no central bank, and the monetary authorities cannot issue balboa-denominate notes. Since 1970 Panama has had no controls on capital mobility and has been financially integrated to the rest of the world. Moreover, for decades Panama has been an important center for offshore banking, with a large number of international banks operating in the country. This, of course, has allowed Panama to face successfully the lender-of-last-resort issue. Panama's most remarkable achievement is its very low rate of inflation. Between 1955 and 1998, it averaged 2.4 percent per annum, and during the 1990s it barely exceeded 1 percent per year. In addition to low inflation, Panama has posted a healthy rate of growth during the last four decades. Between 1958 and 1998, Panama's real GDP expanded at 5.3 percent per year, and during the 1990s, growth has been a full percentage point higher than that of the Latin American countries as a group—4.4 versus 3.4 percent per year.

As pointed out, however, behind these achievements hides Panama's serious historical addiction to IMF financing. In spite of not having a central

bank or a currency of its own, for years Panama failed to maintain fiscal discipline. Initially, these large fiscal deficits were financed through borrowing from abroad, and when the foreign debt became too high, the IMF stepped in with fresh resources. When this was not enough, Panama restructured its foreign debt. Panama had its first IMF Stand-By program in 1965. A year later, adjustment was achieved, and the fiscal deficit was brought into check. In 1968, however, the fiscal accounts were again out of hand, and the IMF was called in once more. A remarkable nineteen-year period of uninterrupted IMF programs was thus initiated. Although in some of the early programs there were no withdrawals, the sheer presence of the IMF signaled that, in case of need, the monies would indeed be there.

Year after year, a new IMF program called for the strengthening of public finances. Invariably, year after year, Panama failed to take serious action. After all, the authorities knew that the IMF was there, ready to bail them out. This vicious circle was only broken in 1987, when as a result of General Noriega's confrontational policies and involvement in narcotics trafficking, Panama was subject to severe United States–led economic sanctions. The IMF returned to Panama in September of 1990 with a monitored program. This was followed by lending programs in 1992 (twenty-two months), 1995 (sixteen months), and 1997 (thirty-six months). Significantly, in the last few years the authorities have finally acknowledged the need to maintain a solid fiscal position. Between 1990 and 1996 the country posted public-sector surpluses, and in the last three years it has run modest deficits.

In contrast with Argentina, Panama has successfully eliminated devaluation risk. This has been reflected in a relatively low cost of capital in international financial markets. In that regard, it is illustrative to compare the spreads over U.S. Treasuries of Brady bonds issued by Panama and Argentina. Between January 1997 and December 1998 the average daily spread on Panamanian par bonds was 464 basis points, significantly lower than that of Argentine par Brady bonds, which averaged 710 basis points.

It is very important to note, however, that although there is no devaluation risk in Panama, the country has continued to be subject to sizable country risk and to contagion. In fact, as figure 1.7 shows, the spread over Treasuries of Panamanian Brady bonds has been volatile and has experienced important jumps in response to political shocks—such as the uncertainty over the president's intentions to perpetuate himself in power in 1998—and external developments, including the Russian crisis of 1998. More to the point, the spread over Panamanian bonds has systematically been higher than that of Chile's sovereign bond, and Chile, as has been pointed out, is a country that during the period under discussion experienced an overall increase in the degree of exchange rate flexibility. A careful study of Panama's monetary history suggests that dollarization does not, on its own, assure fiscal solvency and prudence. This has to be accomplished through the creation of budget-related institutions.
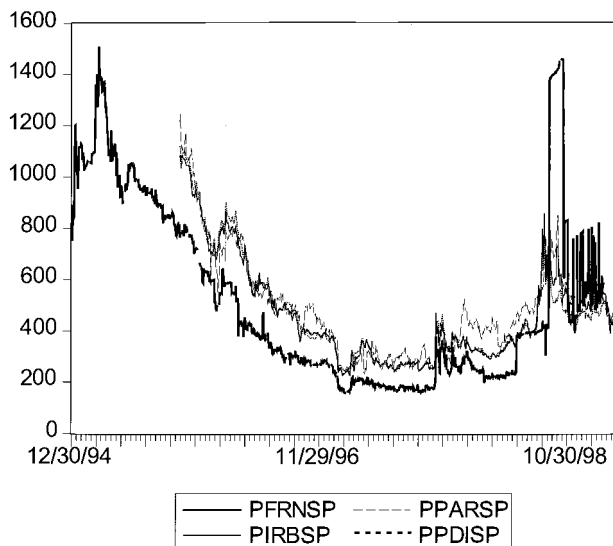
Fig. 1.7   Panama Brady bonds spreads (daily data, December 1994–May 1999)

Until recently, much of the discussion on dollarization has focused on the loss of seigniorage that would result from unilateral dollarization. Supporters of dollarization have argued that the way to deal with the seigniorage issue is to sign a monetary treatise with the United States, under which lost seigniorage would be partially refunded to Argentina. This is not a new idea. In fact, it was proposed in 1972 by Harry Johnson within the context of the Panamanian experience. Such an initiative, however, is likely to face serious political problems. This said, however, it is important to notice that early in the year 2000 legislation aimed at sharing seigniorage in case of dollarization was introduced to the U.S. Senate. The bill, sponsored by Florida's senior senator Connie Mack, establishes specific criteria to be used to calculate what percentage of seigniorage would be transferred to the emerging market in question. In my opinion, however, it is highly unlikely that this bill will be passed any time soon.

On the Feasibility of Floating Exchange Rates in Emerging Economies: Lessons from Mexico

For many years it has been argued that emerging countries cannot successfully adopt a freely floating exchange rate regime. Two reasons have traditionally been given for this position: first, it has been argued that because emerging countries tend to export commodities or light manufactures, a floating exchange rate would be "excessively" volatile. Second, and

related to the previous point, it has been argued that emerging countries don't have the institutional requirements to undertake effective monetary policy under purely floating exchange rates (Summers 2000). According to this perspective, emerging markets that float would be unable to implement the type of (rather complex) feedback rule required for implementing an effective inflation targeting system. In particular, it has been argued that countries that float after a currency crisis will be unable to stabilize the value of their currency. This view is expressed by Eichengreen and Masson (1998, 18–19), who, after discussing the merits of floating rates and inflation targeting, state:

> [I]t is questionable whether a freely floating exchange rate and an inflation target objective for monetary policy are feasible, advisable or fully credible for many developing and transition economies . . . [T]hese economies are subject to substantial larger internal and external shocks . . . and the transmission mechanisms through which monetary policy affects the economy and the price level tend to be less certain and reliable.

More recently, a new objection to floating in emerging markets has been raised. Some authors, most notably Calvo (1999), Reinhart (2000), and their associates, have argued that in a world with high capital mobility, incomplete information, fads, rumors, and dollar-denominated liabilities, the monetary authorities will be severely affected by a fear of floating. This is because significant exchange rate movements, and in particular large depreciations, will tend to have negative effects on inflation and on corporate debt. According to this view, floating regimes in emerging markets will be so only in name. In reality, countries that claim to float will be "closet peggers," making every effort, through direct intervention (selling and buying reserves) and interest rate manipulation, to avoid large exchange rate fluctuations. These countries will be in the worst of worlds: they will have de facto rigid exchange rates and high interest rates. Reinhart (2000, 65) has aptly summarized the fear-of-floating view:

> Countries that say that they allow their exchange rate to float mostly do not; there seems to be an epidemic case of "fear of floating." Relative to more committed floaters . . . exchange rate volatility is quite low . . . [T]his low relative–exchange rate volatility is the deliberate result of policy actions to stabilize the exchange rate.

After analyzing the behavior of exchange rate, international reserves, and nominal interest rate volatility, Reinhart concludes that those emerging markets usually considered to be floaters—Bolivia, India, and Mexico—are subject to the fear-of-floating syndrome. She goes on to argue that, under these circumstances, "lack of credibility remains a serious problem," and that the only way to avoid it may be "full dollarization" (69).

In a recent paper, Levy and Sturzenegger (2000) follow (independently) an approach similar to that proposed by Reinhart (2000) to analyze exchange rate policy in emerging economies. These authors use data on the volatility of international reserves, the volatility of exchange rates, and the volatility of exchange rate changes for ninety-nine countries, during the period 1990–98, to determine their true exchange rate regime. Their analysis begins with the well-known fact that the classification system used by the IMF tends to misclassify countries. The authors undertake a series of cluster analysis exercises to classify the countries in their sample into five categories: (a) fixed, (b) dirty float or crawling peg, (c) dirty float, (d) float, and (e) inconclusive. The results from this study tend to contradict the fear-of-floating hypothesis. Indeed, Levy and Sturzenegger find out that for their complete sample, 273 cases out of a total of 955 can be classified as floaters. This, of course, does not mean that a number of countries are wrongly classified according to the IMF. For example, they find that in 1998 there were twelve countries that had been classified as floaters by the fund but that did not really float. Interestingly enough, there were also some fixers that did not fix.

Some of the emerging countries that, according to this study, had a floating regime during 1997–98 (the last two years of their sample) include Chile, Colombia, Ghana, India, and South Africa. A particularly important case is Mexico, a country whose authorities have strongly claimed to have adopted a freely floating rate after the collapse of 1994. The Levy and Sturzenegger analysis indeed suggests that, after a transitional period in the two years immediately following the currency crisis, Mexico has had, since 1997, a freely floating exchange rate regime. According to this study, during 1995 Mexico had a dirty or crawling peg regime. This evolved, in 1996, to a dirty float and, finally, in 1997 to a free float. This means, then, that Mexico's experience can indeed be used as an illustration of the way in which a floating regime will tend to work in an emerging country. Of course, it is not possible to extract general conclusions from a single episode, but in the absence of other experiences with anything that resembles a floating rate, analyses of Mexico's foray into exchange rate flexibility should prove very useful.

Figure 1.8 presents weekly data on the nominal exchange rate of the Mexican peso vis-à-vis the U.S. dollar for the period January 1992 through October 1999. The top panel depicts the nominal peso-dollar rate, and the bottom panel presents the weekly rate of devaluation of the Mexican peso during that period. These figures clearly show the heightened volatility that followed the currency crisis of December 1994. By late 1995, however, Mexico had managed to stabilize the peso-dollar rate. During the second of November, 1995 the peso-dollar rate was at 7.77, and almost two years later, during the second week of October 1997, it was 7.71. At that time, and partially as a result of the East Asian crisis, the peso depreciated significantly.
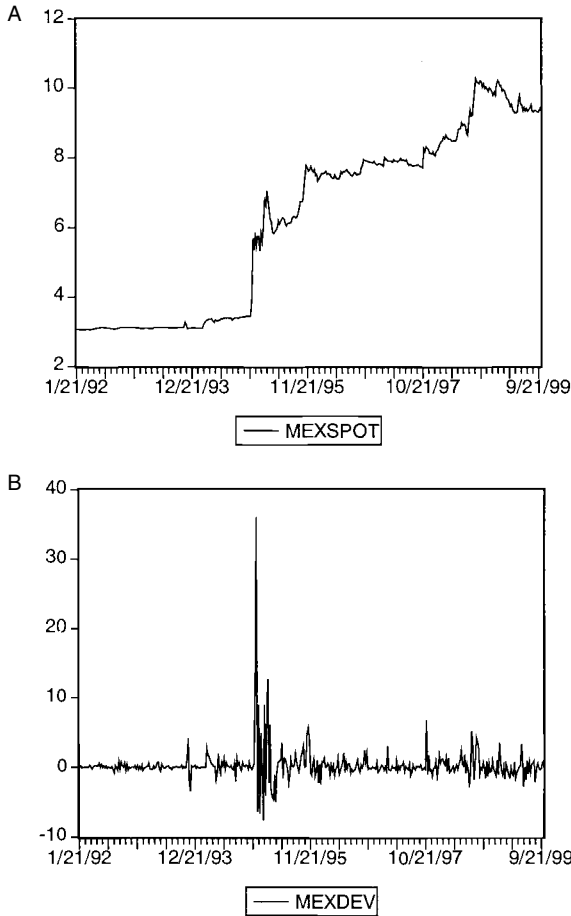
Fig. 1.8   *A,* **Mexican peso-U.S. dollar exchange rate: spot exchange rate (weekly data, January 1992–October 1999);** *B,* **Mexican peso-U.S. dollar exchange rate: rate of depreciation of the peso (weekly data, January 1992–October 1999)**

The peso continued to lose ground until October 1998, when in the midst of the global liquidity squeeze the peso-dollar rate surpassed 10. Once global liquidity was restored the peso strengthened significantly, as the figure shows, and during October-November 1999 it fluctuated around the 9.3 to 9.4 mark. At the time of this writing, September 2000, the peso-dollar rate continues to fluctuate around that level.

Volatility

Tables 1.4 and 1.5 present a series of indicators to compare the volatility of the peso-dollar rate with the rates of the deutsche mark, Japanese yen, British pound, Australian dollar, Canadian dollar, and New Zealand dollar

Table 1.4   Exchange Rate Volatility in Several Countries, 1991–99

Daily Exchange Rates	Australia	Canada	France	Germany	Japan	New Zealand	Mexico	United Kingdom
1991								
No. of obs.	260	260	260	260	260	260	n.a.	260
Mean absolute % change	0.278	0.135	0.575	0.623	0.442	0.286	n.a.	0.532
Standard deviation of % change	0.274	0.131	0.534	0.577	0.407	0.303	n.a.	0.516
Max absolute % change	2.078	0.842	2.720	3.144	2.780	2.005	n.a.	3.058
No. of obs. with zero change	19	17	13	12	13	23	n.a.	17
1992								
No. of obs.	262	262	262	262	262	262	260	262
Mean absolute % change	0.306	0.225	0.686	0.639	0.399	0.268	0.109	0.601
Standard deviation of % change	0.298	0.208	0.677	0.560	0.389	0.279	0.141	0.590
Max absolute % change	1.646	1.471	4.046	2.668	2.988	1.734	1.092	3.081
No. of obs. with zero change	13	14	10	9	11	39	26	13
1993								
No. of obs.	261	261	261	261	261	261	261	261
Mean absolute % change	0.445	0.248	0.498	0.514	0.486	0.308	0.132	0.543
Standard deviation of % change	0.380	0.204	0.432	0.436	0.472	0.327	0.316	0.494
Max absolute % change	1.801	1.070	2.320	2.329	2.871	2.492	4.012	2.746
No. of obs. with zero change	16	14	12	14	11	21	34	21
1994								
No. of obs.	261	261	261	261	261	261	261	261
Mean absolute % change	0.324	0.196	0.400	0.416	0.419	0.248	0.444	0.299
Standard deviation of % change	0.293	0.169	0.359	0.374	0.400	0.238	1.977	0.289
Max absolute % change	1.600	0.905	2.512	2.416	3.353	1.312	19.356	1.762
No. of obs. with zero change	25	12	9	9	12	29	35	12
1995								
No. of obs.	261	261	261	261	261	261	261	261
Mean absolute % change	0.350	0.235	0.466	0.541	0.595	0.292	1.063	0.346
Standard deviation of % change	0.354	0.243	0.488	0.532	0.622	0.248	1.755	0.362
Max absolute % change	1.921	1.674	2.893	3.003	3.328	1.254	10.465	1.975
No. of obs. with zero change	30	17	10	10	11	21	60	16

1996								
No. of obs.	262	262	262	262	262	262	262	262
Mean absolute % change	0.273	0.133	0.276	0.299	0.345	0.280	0.231	0.253
Standard deviation of % change	0.292	0.120	0.252	0.279	0.351	0.264	0.227	0.293
Max absolute % change	2.664	0.645	2.012	2.142	2.235	1.414	1.221	2.539
No. of obs. with zero change	30	18	9	12	13	15	35	18
1997								
No. of obs.	261	261	261	261	261	261	261	261
Mean absolute % change	0.428	0.190	0.457	0.469	0.523	0.357	0.282	0.380
Standard deviation of % change	0.391	0.167	0.381	0.379	0.511	0.351	0.522	0.353
Max absolute % change	3.066	1.052	1.872	1.957	2.868	2.324	6.984	2.151
No. of obs. with zero change	26	16	8	8	11	14	22	11
1998								
No. of obs.	261	261	261	261	261	261	261	261
Mean absolute % change	0.608	0.294	0.413	0.410	0.792	0.673	0.569	0.328
Standard deviation of % change	0.597	0.295	0.367	0.365	0.797	0.643	0.778	0.278
Max absolute % change	4.479	2.096	1.926	1.932	5.495	3.939	4.950	1.718
No. of obs. with zero change	15	14	8	11	8	12	25	9
1999 (~Dec 20)								
No. of obs.	252	252	252	252	252	252	252	252
Mean absolute % change	0.439	0.267	0.422	0.422	0.602	0.510	0.356	0.328
Standard deviation of % change	0.360	0.228	0.372	0.374	0.551	0.457	0.450	0.275
Max absolute % change	1.714	1.382	2.349	2.389	3.118	3.078	3.792	1.452
No. of obs. with zero change	21	9	13	13	7	12	28	10

Source: Constructed from data obtained from Datastream.

Note: n.a. = not available.

Table 1.5   Comparative Exchange Rate Volatility (weekly data)

Weekly Exchange Rates	Australia	Canada	France	Germany	Japan	New Zealand	Mexico	United Kingdom
1991								
No. of obs.	51	51	51	51	51	51	n.a.	51
Mean absolute % change	0.654	0.320	1.348	1.398	0.866	0.678	n.a.	1.257
Standard deviation of % change	0.564	0.253	0.953	0.988	0.856	0.617	n.a.	0.871
Max absolute % change	3.118	1.166	3.519	3.759	3.638	2.708	n.a.	3.482
No. of obs. with zero change	0	0	0	0	1	2	0	0
1992								
No. of obs.	52	52	52	52	52	52	51	52
Mean absolute % change	0.669	0.583	1.726	1.573	0.938	0.530	0.296	1.539
Standard deviation of % change	0.684	0.444	1.367	1.164	0.830	0.544	0.296	1.497
Max absolute % change	3.335	2.158	6.248	4.741	3.393	3.194	1.051	9.906
No. of obs. with zero change	0	0	0	0	1	1	1	1
1993								
No. of obs.	53	53	53	53	53	53	53	53
Mean absolute % change	0.911	0.543	1.183	1.244	1.112	0.631	0.302	1.372
Standard deviation of % change	0.686	0.538	0.829	0.937	0.770	0.567	0.597	0.995
Max absolute % change	2.856	2.203	3.530	3.830	3.037	3.379	3.631	3.897
No. of obs. with zero change	0	2	0	0	0	0	0	1
1994								
No. of obs.	52	52	52	52	52	52	52	52
Mean absolute % change	0.621	0.460	0.924	0.987	0.951	0.584	1.144	0.715
Standard deviation of % change	0.531	0.293	0.706	0.754	0.776	0.400	4.645	0.552
Max absolute % change	3.155	1.272	2.903	3.212	3.325	1.765	33.670	2.093
No. of obs. with zero change	0	0	0	0	2	3	2	0
1995								
No. of obs.	52	52	52	52	52	52	52	52
Mean absolute % change	0.869	0.539	1.089	1.219	1.438	0.595	2.441	0.743
Standard deviation of % change	0.636	0.414	1.053	1.219	1.304	0.464	3.041	0.668
Max absolute % change	3.443	1.653	4.910	5.197	4.660	2.140	17.721	2.284
No. of obs. with zero change	1	1	0	0	0	0	1	0

1996								
No. of obs.	52	52	52	52	52	52	52	52
Mean absolute % change	0.632	0.310	0.681	0.697	0.733	0.584	0.548	0.685
Standard deviation of % change	0.602	0.240	0.607	0.650	0.587	0.440	0.500	0.610
Max absolute % change	2.745	1.267	2.449	2.768	2.285	1.974	2.428	2.643
No. of obs. with zero change	4	0	0	0	0	0	0	1
1997								
No. of obs.	52	52	52	52	52	52	52	52
Mean absolute % change	0.902	0.518	0.902	0.902	1.186	0.744	0.624	0.806
Standard deviation of % change	0.702	0.376	0.694	0.707	1.088	0.732	0.937	0.722
Max absolute % change	4.028	1.882	3.112	3.030	5.049	2.865	6.331	3.020
No. of obs. with zero change	0	0	0	0	1	0	2	1
1998								
No. of obs.	52	52	52	52	52	52	52	52
Mean absolute % change	1.614	0.685	1.073	1.064	2.122	1.460	1.328	0.826
Standard deviation of % change	1.258	0.628	0.694	0.688	2.328	1.300	1.466	0.641
Max absolute % change	5.826	2.818	2.880	2.801	14.908	5.587	7.576	2.614
No. of obs. with zero change	1	0	0	0	0	1	0	0
1999 (~Dec 17)								
No. of obs.	51	51	51	51	51	51	51	51
Mean absolute % change	1.015	0.553	1.119	1.118	1.598	1.103	0.828	0.768
Standard deviation of % change	0.756	0.465	0.689	0.697	1.191	0.864	0.820	0.523
Max absolute % change	3.210	1.704	2.859	2.880	5.620	3.787	3.637	2.612
No. of obs. with zero change	0	1	0	1	0	2	0	0

Source: Constructed from data obtained from Datastream. n.a. = not available.

to the U.S. dollar, as well as the French franc-deutsche mark rate. While table 1.4 deals with daily exchange rate data, table 1.5 presents volatility statistics for weekly data. Generally speaking, the results presented in these tables provide no support for either the idea that the peso-dollar rate has been "excessively" volatile after 1995 nor for the notion that the Mexican peso has been "abnormally" stable. In fact, according to the mean absolute percentage change and the standard deviation of change, the peso-dollar rate was as volatile as the other currencies during 1997. In 1998, its degree of volatility increased significantly but was lower than the yen-dollar rate. In 1999 the extent of volatility declined, and the peso was once again in the middle of the pack. The overall conclusion from the high-frequency volatility analysis is, then, that Mexico does not appear to be different, in terms of volatility, from other floaters.

Monetary Policy, Feedback Rules, and Transparency

The stabilization of the exchange rate at around 7.7 pesos per dollar in 1996 surprised many analysts, for two reasons. First, with a still rapid rate of inflation it was expected that the peso would continue to depreciate at a somewhat rapid pace. Second, the Bank of Mexico stated repeatedly that it was (almost completely) abstaining from intervening in the foreign exchange market. In fact the Bank of Mexico stated that between 1996–97 it never sold foreign exchange, and only on very few occasions it provided signals to the local financial market, suggesting that it would tighten liquidity. No "signals," were provided during 1997.[22]

Market participants, however, were skeptical about the hands-off policy allegedly followed by the Bank of Mexico and believed that, as is often the case in industrial countries, there was a gap between what the Bank of Mexico said and what it actually did. In particular, by mid-1997 market analysts believed that the Bank of Mexico was following a complex monetary policy feedback rule that incorporated exchange rate behavior prominently. The chief economist of Bear Sterns stated in *The Wall Street Journal*: "Mexico stopped its economic and financial deterioration almost overnight [in the aftermath of the 1994 devaluation] by announcing a feedback mechanism between the exchange rate . . . and . . . monetary liquidity" (20 October 1997, A.23). Moreover, JPMorgan's *Emerging Markets Data Watch* of 3 October 1997 (page 6) noted that "It has often been argued in the past year or two that Banxico has been exacerbating upward pressure on the peso by tightening monetary policy." These analysts did not venture to opine on whether the feedback rule was of a Taylor type or whether it was of a looser, and yet more complex, type, such as the ones advocated by supporters of inflation targeting in an open economy (Svensson 1999).

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22. See Edwards and Savastano (1999) for a detailed discussion of the bank of Mexico's official description of the way it conducted monetary policy during that period. See also Aguilar and Juan-Ramon (1997).

Between 1995 and 1999, when an inflation-targeting approach was adopted, the Bank of Mexico's official monetary policy consisted of targeting the monetary base on a day-to-day basis.[23] No attempt was made, according to the official view, at targeting interest rates, nor was the exchange rate a consideration in setting liquidity (O'Dogherty 1997). This system was supposed to work as follows: Early in the year the Bank of Mexico announced the day-to-day target for monetary base. This, in turn, was consistent with the official inflation goal, and incorporated expected changes in money demand and seasonality. If, for whatever reason, the Bank decided to alter its stance it did that by sending a signal to the banking sector. This was done by announcing, and thereafter enforcing, a (very) small change in the banking system cumulative balances (O'Dogherty 1997). What puzzled Mexico observers was the small number of episodes in which the Bank of Mexico acknowledged having modified the stance of its monetary policy in response to market developments. By its own reckoning, the Bank of Mexico changed the stance of monetary policy fifteen times between 25 September and 25 December 1995 and eight times between December 1995 and November 1996, and it kept the stance unchanged (at a "neutral" level— i.e., a cumulative balance of zero) during 1997 (Gil-Díaz 1997; Aguilar and Juan-Ramón 1997). According to Mexico's monetary authorities, then, all movements of interest rates and the exchange rate in, say, 1997 (or in any other long period between changes in the Bank of Mexico's objective for the system's cumulative balance) did not justify or elicit a response of monetary policy. Edwards and Savastasno (1998) used weekly data to investigate whether, as stated, the Bank of Mexico followed a mostly hands-off monetary policy, or, as market participants suspected, it followed some type of feedback rule. Their findings suggest, very strongly, that during 1996–97 the Bank of Mexico did follow a monetary policy feedback rule, according to which developments in the exchange rate market were explicitly taken into account when the amount of liquidity made available to the market was determined. More specifically, the authors found that the Bank of Mexico tightened the monetary base, relative to its target, when the peso experienced a "large" depreciation. This analysis indicates that, although monetary policy responded to changes in the peso-dollar exchange rate, the Bank of Mexico did not defend a specific level of the peso.

These results are important for five reasons: First, they clearly indicate that, contrary to the Mexican authorities' claims, the central bank made a concerted effort to stabilize the peso. Second, the results also show that this intervention was not undertaken directly through the foreign exchange market; instead, daily decision on monetary policy were affected by exchange rate developments. Third, the results also suggest that, in spite of the skeptic's view, in emerging economies it is possible for the monetary authority to implement an effective and complex feedback rule, of an aug-

23. The discussion that follows is partially based on Edwards and Savastano (1999).

mented Taylor type.[24] Fourth, they suggest that during this period the Bank of Mexico was concerned with the inflationary implications of exchange rate movements. No attempt was made at defending a particular level of the exchange rate. Fifth, these results clearly illustrate that under a floating regime the issue of transparency—and, more specifically, of verifiability—can be serious, and even highly destabilizing. In the case of the Mexican peso discussed above, the *Economist* (14–18 March 1998, 17) pointed out that puzzled investors were not sure how to interpret the relative stability of the peso during 1997:

> [D]istrustful investors have wondered aloud whether the central bank—which lost much credibility with the collapse—really enjoys independence. . . . [T]he doubters have noted that the government's policy on the peso, which is theoretically free to float, has actually been set by a committee.

Calvo (1999) has persuasively argued that, to the extent that there are poorly informed participants in the market for emerging market debt, the lack of transparency and credibility of the authorities will leave these countries open to speculation based on rumors and herd instinct. These, in turn, can easily result in major attacks on the currency. Frankel, Schmukler, and Serven (2000) have recently discussed the issue of exchange rate and monetary policy verifiability. According to them, under most circumstances it is difficult and costly for analysts, even for very sophisticated ones, to actually verify whether a particular country is, in fact, following the policies that it has announced. This view is certainly supported by the work on Mexico discussed above; it took Edwards and Savastano (1999) a substantial amount of time and some detective-type work to unearth the Bank of Mexico reaction function. The above discussion does not mean that emerging countries should avoid complex feedback rules or should abstain from floating. What it underscores, however, is the need to communicate to the public, in as transparent a way as possible, the type of policy that is being followed (see Bernanke et al. 1999 for a discussion of monetary authorities' communication strategies within an inflation-targeting context).

Mexican Lessons and Fear of Floating

As pointed out, according to the fear-of-floating hypothesis, rather than letting the exchange rate fluctuate freely, emerging markets will intervene actively in the domestic financial market, generating a "rigid exchange rate–cum–high interest rates" situation. This point of view has been expressed, very forcefully, by the Inter-American Development Bank's chief economist, Ricardo Hausmann (2000). According to him, depreciations of the Mexican peso have been followed by hikes in interest rates, reflecting mas-

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24. Naturally, as pointed out above, it is difficult to make general statements on the basis of one historical case. Nonetheless, Mexico's experience is very useful.

sive government intervention, and thus an intense fear of floating. This situation, Hausman has argued, contrasts with countries such as Australia, where the currency has (recently) depreciated, while domestic interest rates have remained relatively stable.

Although Mexico has indeed adjusted its monetary policy in response to (some) exchange rate developments, there is little evidence suggesting that, since 1997, it has been subject to a significant fear of floating. Figure 1.9 presents weekly data on the peso-dollar nominal exchange rate and on the nominal interest rate on twenty-eight-day government securities (CETES) between 1994 and October of 1999. Table 1.6, on the other hand, presents correlation coefficients between these two variables for different subperiods. As may be seen from this table, the alleged strong positive relationship between the peso-dollar exchange rate and the nominal interest rate on government securities is confined to a rather short subperiod. In effect, between January 1996 and October 1997—when Mexico, as well as the rest of Latin America, was affected by the East Asian crisis—these two variables were
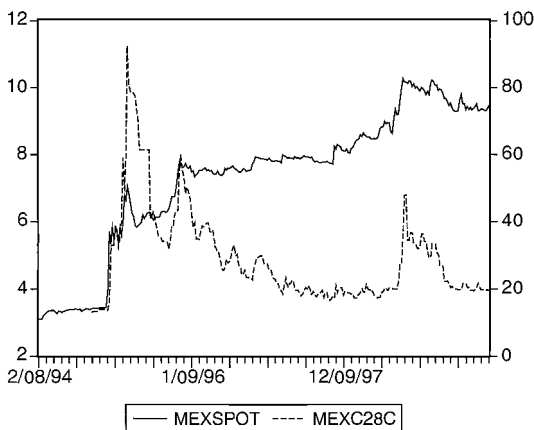
Fig. 1.9   Mexico exchange rate and twenty-eight-day nominal interest rate (cetes; weekly data, 1994–99)

Table 1.6   Correlation Coefficients Between Mexico's Exchange Rate and Nominal Interest Rate: Weekly Data, 1996–99

Period	Correlation Coefficient
January 1996–October 1997	−0.60
November 1997–May 1998	0.04
June 1998–April 1999	0.83
May 1999–October 1999	0.08
January 1996–October 1999	0.08

Source: Computed by the author using data from the Datastream database.

negatively correlated. Between November 1997 and May 1998, Mexico looked a lot like Australia, as the peso depreciated significantly (an accumulated 15.4 percent) with stable interest rates. During this period, which corresponds to the first five months in office of a new Central Bank governor, the correlation between the two variables was virtually zero.

After the Russian crisis of August 1998 and the subsequent dry-up of global liquidity, the peso and Mexican domestic interest rates did, indeed, exhibit a positive correlation. At that time, due to a severe attack on the currency, the Mexican authorities decided that this was a temporary situation and that allowing the peso to weaken further would compromise the inflation target. This type of reaction is indeed what a modern and forward-looking inflation-targeting model would indicate (Bernanke et al. 1999). Indeed, in an elegant recent paper Svensson (1999) has developed an inflation-targeting framework that allows for this type of nonlinear, threshold-triggered reaction and judgment-aided reaction to occur.

In retrospect, it is difficult to believe that, had Mexico had a super-fixed exchange rate regime, it would have been able to face the 1998 global liquidity squeeze more effectively. After all, during 1999 the economic recovery continued, inflation was on target, employment grew at healthy rates, and interest rates declined significantly. Moreover, broadly speaking, the exchange rate has gone back to approximately its precrisis level. It should be emphasized, however, that Mexico's successful experience of the last few years does not mean that every country that floats will behave in this way. It does mean, however, that the fear of floating is not as pervasive as claimed. It does also mean that not every monetary policy feedback rule is detrimental to the country's well-being. If implemented correctly, and supported by the right type of fiscal policy, these rules can be very useful in improving macroeconomic management.

1.1.5   Concluding Remarks

The emerging markets' financial crises of the second half of the 1990s have changed economists' views with respect to exchange rate policies. An increasing number of analysts in academia as well as in the official and private sectors argue that pegged-but-adjustable exchange rate regimes are unstable and invite speculation. This view has been taken by the U.S. secretary of state, as well as by the Metzler Commission Report. According to this perspective, in order to reduce the probability of financial crises countries should move to one of the two-corner exchange rate systems: freely floating exchange rates or super-fixed regimes. In this paper I have analyzed the problems and challenges associated with this policy perspective, including issues related to optimal exit policies and exchange rate feedback rules under floating regimes. Although it is too early to make a definitive statement, the evidence discussed in this paper suggests that, under the appropriate conditions and policies, floating exchange rates can be effective

and efficient. Indeed, much of the criticism of floating rates in the emerging economies seems to be based on a small number of historical episodes, or has misread the difficulties associated with super-fixed systems. Having said that, I will add that it appears to be reasonable to expect that in the years to come the number of currencies in the world will decline. Many countries are likely to realize that they satisfy the "optimal currency area criteria." This, however, is not likely to be an appropriate solution for every emerging nation.

Some analysts have argued that the control of capital inflows is an effective way of helping to prevent currency crises. In section 1.1.3 of this paper I have evaluated Chile's experience with this type of policy. My conclusion is that, although these controls were useful in Chile, their effectiveness has been exaggerated. In particular, there is no guarantee that they will work in the same way as in Chile in other nations that adopt them.

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2. Domingo F. Cavallo

Thank you. I prefer to start talking about money as an institution. As a politician who has had to deal with practical issues in government, I came to the conclusion that economic growth is related much more to the quality of institutions, particularly monetary institutions, than to exchange rate regimes.

In adopting rules of the game for an economy, it is very important to think in terms of the institution's ability to generate the appropriate incentives for growth. Of course, once a particular institution is created, it is very important to maintain it over time. As an institution remains and functions, people's understanding of its purpose increases, and the effectiveness of the institution increases as well. Good institutions are those that provide assurance that property rights of people will be defended as well as the rights of human and financial capital. Good institutions are those that create the appropriate incentives for the efficient use of capital and generate higher productivity levels over time.

Money is very important as an institution. What I see as very important about money is its ability to inspire confidence, its ability to reassure that those property rights that are written and documented in monetary terms will be preserved over time. I would like to speak about the quality of money in order to refer to the ability of a particular money to offer reassurance to somebody who has chosen that currency to write contracts that his or her property rights will be defended. The quality of money can be observed by looking at the existence of long-term contracts. If the interest rate is more or less similar to the expected rate of growth of the economy, that means that a particular money does not embody long-term inflationary expectations, that long-term inflationary expectations have been removed, and therefore people will use that money, for example, for long-term lending or borrowing.

In my country, after forty-five years of inflation, originated by the use and abuse of the government's power to print money to finance public fiscal deficits and even private deficits, the people were convinced that our currency was not a good one and that the government would continue printing money and taxing people's savings. That is why, during the 1980s, Argentines decided to repudiate the Argentine currency, the austral, and they

started to use the dollar. Therefore dollarization is not something that a particular government advocated for Argentina in those days. Dollarization was a decision made by the Argentine people during the 1980s, at a time of high inflation and even hyperinflation. By then, there was more than $20 billion circulating in Argentina. People started to use the dollar for everyday transactions, and of course for saving, because they did not want the government or the Central Bank to tax away their saving and their income.

In order to inspire confidence in the monetary system, we set new rules of the game for the economy and created a new monetary regime. We decided that we had to allow Argentines to continue using the dollar. We could not prohibit the use of the dollar, because if we had said "now, it is obligatory to sell all the dollars you have to the authorities, and it is forbidden to use the dollar any more," no Argentine would have believed in our commitment to maintaining a sound Argentine currency. That is why I explain that our monetary system is not a permanent currency board, nor is it a permanent fixed exchange rate regime. Our system is a system of *competitive currencies*. We have at least two currencies, the dollar and the peso. The fixed rate of the Argentinean currency to the dollar is a temporary one, and the currency board is a temporary arrangement, to create confidence in our currency. In order to encourage Argentines to use our currency, we created what we call a convertibility plan, which is different from a fixed exchange rate plan. We called it a convertibility plan because what Argentines demanded was convertibility for the currency that they use. The demand for convertibility for a particular currency in the past came mainly from the negative effects of inflation. Argentines did not want to be in a trap; they wanted to be able to convert their currency, and therefore their wealth—their financial property—from one currency to other currencies. Otherwise, they reasoned, the government would eventually continue to tax away their financial wealth.

In the future, however, the demand for convertibility for a particular currency will come increasingly from globalization. In a globalized world, capital flights will be available to everyone, and individual portfolios will allow for the easy reallocation from one currency to another. If a government tries to force its people to use a particular currency, that will no longer be acceptable to citizens, at least in countries where there is no tradition of respect for property rights.

Thus, in Argentina we have the system that we call "convertibility," and we will maintain the system of allowing the changing of one currency for another forever. If the central bank, the economy minister, the president, or even the congress were to decide that the Argentine currency should be nonconvertible, that saving in the system should be in the local currency or that everyone would be forced to use the local currency exclusively, that would be repudiated by the people.

Now, why fix the value of this newly created currency? At the beginning, you create the currency and you want it to be convertible. There is no other

alternative but to create that currency through a currency board: that is, fully backing the new currency to a high-quality currency (let's say the dollar) in order to assure that the currency that is being created will preserve its value in terms of the "tutor" currency. If you look at history, most currencies that now inspire confidence were created this way. That is, they were backed by gold and convertible into gold. Also, high-quality younger currencies, such as the Singapore dollar, were created through a currency board. It was a currency board that used the pound sterling as its support; then it shifted to the dollar when the sterling became weaker, and then it abandoned the use of a tutor. Also, remember that when the Singapore dollar was floated it appreciated rather than depreciating.

The whole idea that you are in a totally fixed system and you cannot abandon it is wrong. It is perfectly possible to move from a fixed system to a floating system, if at the time of adopting a floating system there are no forces generating a sharp devaluation, but, on the contrary, there are forces generating the appreciation of the currency. Market forces driving a currency appreciation are likely to happen in a country that has set up a good set of rules of the game and has set up good new institutions, because normally a country that adopts this decision starts with a very low level of productivity in all the sectors of its economy. Thus, over a period of ten or twenty years, productivity growth in that country should be higher than in the country that provides the tutor currency. Therefore, there will be a time when the market will call for an appreciation rather than a depreciation of the domestic currency, and that is the time for exiting the fixed exchange rate but preserving its convertibility, which is a key property that people demand from a currency.

We expect favorable market conditions, and this is why we consider convertibility very important and why the fixed exchange rate of the currency is a temporary phenomenon. When the currency inspires enough confidence, we will have a floating exchange rate, but the currency will still be convertible, and people will have the freedom to choose that currency, the national currency, or other currencies.

Now, has this system served Argentina well and prevented crisis? Of course. Look at the figures of the last decade. Since the creation of the new monetary regime, there was no currency crisis in Argentina in comparison with the five decades previous to convertibility. The financial crises were mild, and we overcame them easily and without big losses for the government. In general, the growth that we achieved during the decade was fairly high. Argentina between 1990 and the year 2000, in a period of ten years, expanded its economy 54 percent. Of course, Chile had a larger expansion, 88 percent, but Chile had implemented many more reforms at an earlier stage in time, and I will explain some differences in a moment. However, compared with Mexico, which expanded its economy 36 percent, and Brazil which expanded by 30 percent, there is no doubt the growth perfor-

mance of Argentina was very good. Sometimes people say that a fixed exchange rate is bad for exports because it restricts export growth. Look at the figures. Of course, Mexico had a huge expansion of exports, 274 percent, but this was not due to the exchange rate regime: it was due to the North American Free Trade Agreement. Argentina had 118 percent, even more than Chile (at 103 percent), and much more than Brazil, which had a 78 percent increase in total exports. So exports did increase during the decade.

In addition to that, we eliminated inflation. Of course, now we are suffering from deflation, and that is what people perceive as a serious problem, and no doubt it is a problem. It would have been very good if Argentina could have floated its currency before the crisis in Brazil or the devaluation of the euro. However, we could not have floated it during the 1990s, because the peso's flotation would have caused a currency crisis in Argentina because of economic circumstances. In the future, though, we expect that there will be such a moment.

Let me make a final comment. What is the problem now in Argentina? Some people say the currency is overvalued. Argentina is not growing and may face a long period of stagnation and deflation. I think such statements are wrong. Exports are expanding in Argentina. Last year, exports expanded 12 percent. The problem in Argentina is that during the last three or four years investment opportunities have fallen, for two reasons. First, tax increases—very distortive tax increases—affected the cost of capital. Second, rumors of changes to the rules of the game threatened to reduce the profitability of investments in the future. Therefore, investors decided to postpone investments. A business is like a typical family, which, when faced with uncertainty about future income, does not demand loans for purchasing a home or a car. My point is that investment was discouraged in Argentina because of the government's tax increases, not because of the value of the currency itself. Thus, we should not introduce changes to our monetary system, but we should remove these disincentives for investment that deter investment and produce a significant burst of new investments that will generate productivity increases. This way, the Argentine economy will reinitiate a vigorous growth at the same pace it grew in the early 1990s.

3. Arminio Fraga

We are talking here this weekend about exchange rate crises and financial crises in emerging markets. I will give you a brief summary of what I believe are the main factors that one should look for in understanding such crises based on my academic, policy, and market experience.

My view is that most crisis situations have as a basic feature weak balance sheets. The weakness can be found at the government level or in the private sector, and it typically includes situations in which countries or banking sectors borrow short-term to finance development or long-term investments. The interesting question, therefore, is what causes weak balance sheets? The answer can be split into micro and macro reasons. On the micro side—the topic of our next session, with Frederic S. Mishkin's paper—we must discuss financial regimes, including banking, corporate governance issues, and so on. On the macro side, the range of topics covered includes weak fiscal regimes, which are the root cause of many crises, and also problems with monetary regimes and exchange rate regimes. (I will use the last two terms to refer to the same thing.) In the end, there can only be one nominal anchor, as we know.

Let me begin with a classification of exchange rate regimes. I will use the word *fixed* for super-fixed. Fixed to me means that there is a clear commitment, perhaps institutionalized through a currency board or a regional agreement. This differs from what Domingo Cavallo was saying. His emphasis was more on convertibility, and I think the policy debate in the literature has tended to focus more on fixity, rather than convertibility. *Managed* will be the second of three regimes, one in which there is a target. It can be a target rate or band or path or whatever. *Floating* will then be everything else where there is no target, but where some degree of intervention or leaning against the wind may be allowed, provided there is no target. There must really be no target, whether it be announced or not, which is something that is not easy to verify.

I tend to believe with Jeffrey Frankel, who gave a beautiful lecture at the Central Bank of Brazil just this past week, that it is possible to manage something between the extremes. It is not a theoretical impossibility. One could, for example, have a target zone or band. When the exchange rate is inside the band, there may be more room to run an independent monetary policy than when the rate is close to the band, where it becomes more like a fixed exchange rate. The problem is, and as this little example shows, that it gets to be complicated, a notion I will get back to. Also, I believe running an intermediate regime requires a lot of virtue. By that I mean, for example, Asian saving rates, which allow for a lot of flexibility in the conduct of policy, allowing for more room for mistakes.

Let me now be a bit provocative: my view on exchange rate regimes is not that we cannot run intermediate regimes, but that we should not. The reason is, basically, that they lead to two kinds of trouble. One problem is that they lead to *confusion*, and by that I mean confusion by private agents, by society, particularly when they structure their balance sheets. In an intermediate regime, it isn't clear what sort of risk one is subject to (e.g., interest rate risk in a fixed exchange rate regime or exchange rate risk in a floating regime). This may lead to temporarily overoptimistic or pessimistic beliefs,

which are part of human nature and part of markets and therefore may lead to a crisis-prone environment. A second problem with intermediate regimes is that they lead to *temptation*. Here I am mainly thinking about governments and the temptation to postpone adjustment, to hide things, to, in a way, avoid facing reality. The problem is related to something I alluded to when I was here three years ago, which is the typically short horizon with which many governments tend to work, due to electoral cycles and so forth, or what academics would call a time-consistency problem. Thus, to summarize, confusion and temptation are good reasons in my view to avoid the intermediate regimes.

The recent Brazilian crisis illustrates some of the points discussed above, which suggest that one is better off with clean, transparent policies. Immediately after the crisis and the floating of the real, the main questions we asked ourselves were whether to float—to which the answer was yes—and how to go about it.

First of all, it was crucial to make sure that a floating exchange rate would not be inconsistent with our goal of providing a long-term, stable environment for the development and growth of our economy. That meant we had to provide a new nominal anchor. We chose inflation targeting, given the unreliable nature of running monetary policy with money aggregates. Inflation targeting goes beyond just having a target for inflation. We think about it almost as a ritual, a routine, a methodical pursuit of a transparent goal, along the lines discussed by Mishkin in his book with Bernanke and coauthors (Bernanke et al. 1999). Inflation targeting requires explaining very carefully and on a timely basis what the central bank does and having long-term objectives to avoid the typical time-consistency problems. It is interesting to note that, as it relates to the exchange rate, inflation targeting introduces an automatic response to volatility. For example, a depreciation of the exchange rate increases expected inflation, and, ceteris paribus, induces a tighter monetary policy (a form of automatic leaning against the wind).

Second—and here I'd like to make one brief point—when we talk about fixed exchange rates, we tend to say that, in order to support the fixed exchange rate, we need a very strong fiscal regime, very strong banking, and so on, as if we didn't need them with a float. There is no real difference, however. Both regimes do well or not depending on the consistency of the overall conduct of macroeconomic policy. For instance, with a weak fiscal regime, I do not think one can run a proper floating exchange rate either. Oftentimes we heard in the political debate back home that floating was a way to run a looser budget. That is just not the case. Indeed, I believe the key factor behind Brazil's recent recovery was the fiscal turnaround that actually started before the crisis and luckily has stayed in place and is being deepened as we move along.

Another issue worth mentioning here belongs to the micro side. In striv-

ing to avoid recurrent crises we must be very careful to design policies that are volatility-reducing rather than volatility-suppressing policies, and this is a concept that I heard first from Carlos Massad, my counterpart in Chile, in a recent seminar at the Bank of England. I like that definition: you want to do things that help you reduce and not hide volatility. Here the sequencing of policies and reforms plays a key role. It is important to strengthen the prudential regime before liberalizing the financial sector. We started the process in Brazil with new provisioning rules, new accounting rules, the introduction of market risk as part of capital requirements, and so on. I won't go into detail.

Just to conclude, let me note that since the floating of the real in the crisis of early 1999 we are often asked whether we are afraid of floating. The answer to that is clear when we look at the data: interest rate volatility has declined and exchange rate volatility has increased substantially since the floating, reaching levels similar to those found in countries that traditionally float.

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4. Jacob A. Frenkel

I'd like to join the previous speakers in thanking and complementing Sebastian Edwards on his paper on exchange rates and exchange rate systems in the context of risk avoidance and risk management. Of course, the issue of exchange rates and exchange rate regimes, or monetary policy and its implications for exchange rates, is not a new one. As a matter of fact, looking back at the programs of the American Economic Association for the past twenty years, there was not a single year without a session on these issues. Nevertheless we come back to them, not because we did not have answers, but because the answers change. The answers change, of course, because the circumstances change. Several key concepts that will come up in the discussion today were completely absent in the past. Therefore, our attitude is indeed legitimately changing. Notions of capital flows as being the sine qua non within which we have to discuss these issues simply did not exist. Credibility, balance sheet tests, the issue of pricing of risks, moral hazards, dis-

tinction between nominal and real exchange rates, the role of short-run versus long-run when time is moving relatively fast, and so on—obviously, once those issues are on the table, our approach to exchange rate analysis differs. Let me cover several basic points here.

First, in the context of this new reality, which you can call "globalization" or "integrated capital markets," what are the implications for issues that were at the fore just a few years ago: intervention policies, stabilization policies, pass-through from exchange rates to prices, and Phillips-curve relationships and their relationship to exchange rate systems? Let me begin by saying that I truly believe that the issue of "corners" is a complex one. Because we all live in the intermediate period, an intermediate regime should be all right. However, if there is anything that capital market integration shows us, it is that what we thought was a very simple mechanism of being an in-between regime, having neither clean float nor fully fixed rates, is much more complicated. It is also likely to be much less attractive.

At the end of the day, one needs to gravitate to one of those extremes. Look at my own country's experience. I don't think there is a single exchange rate regime that Israel did not go through. It had a peg to the dollar, a peg to the basket, a horizontal band, a sloped band, a widening slope, a parallel-to-boundaries band, and a nonparallel-to-boundaries band. If one needed a lesson, or an example, of a case in which there is no single exchange rate regime that is the cure for all ills, that's a good one. However, are there some key lessons that have been learned?

In terms of the fear of floating that Edwards speaks about: in Israel, there was a new government in 1977 that thought it had to liberalize everything. Indeed, overnight there was a complete liberalization of the foreign exchange markets, and within a very short period of time the seeds of hyperinflation were sown. We had a stable economy; still, the movement was toward hyperinflation in 1985. Paradoxically, or interestingly enough, it ended because of an exchange rate anchor. The question was, why did the regime fail? The answer is that it jumped from a plane without a parachute. The parachute, in this context, is the creation of markets. I believe it is not a question of which exchange rate policy or which exchange rate regime one has, but rather whether one has the necessary institutional setting. And I think *that* is a major lesson. One must have a well-functioning market to allow the luxury of choosing the best regime. This particular episode in Israel created a twenty-year drama that had to be resolved only in a much later stage when practical floating came into being. When you deal within a political milieu, occasionally you must introduce measures of progress very gradually. Unless, of course, you are pushed into change by crisis. In Israel, we introduced a band, and the band was upward sloping, and we gradually removed foreign exchange controls. Unless you remove foreign exchange controls, you must have "wider roads," because you are allowing faster traffic. Therefore, there was in fact a formal link between exchange rate variability that was al-

lowed by the regime and the openness of the capital account. As you open the capital account, you must allow larger variability of exchange rates to become an integral part of the system. However, if you have larger variability of exchange rates, and you need to avoid the cost of variability, then it becomes essential to develop the market mechanisms and the instruments that are capable of dealing with such variability. Thus the distinction between suppressed volatility and reduced volatility comes into being. You need to actually price volatility properly. So, at least in our context, it becomes an integral part of financial market developments, rather than exchange rate policies.

But then, what does monetary policy do? Here I think that, within the framework of having the tendency toward less schizophrenic monetary authorities all over the world, that is, a much crisper target or objective, we adopt inflation targeting. Once you adopt inflation targeting, however, it is much simpler and almost necessary to have more flexibility in exchange rates. Here perhaps there is a distinction between countries that come into the game from a legacy of less credible financial systems and monetary policy and countries, like the industrial countries, that have had a lot of credibility. A nominal anchor does not have to be tested by actually stopping the boat.

Rather, you can ask: could I lift the anchor when I need to move the boat? As you introduce the anchor, as we did in the stabilization program in the shape of a nominal exchange rate anchor, the key question is what happens when you lift the anchor? Does it mean a collapse of stability? Or does it mean a graduation in stability that allows you to lift the anchor and go to the open sea? Indeed, once you have inflation targeting, you are much clearer in the domestic political debate about your responsibilities. You are not in charge of fixing the competitiveness of the export sector. And that's key, because time and again, monetary authorities that have not been fully independent—not in the legal sense but in the practical sense—have been put under tremendous pressure from interest groups within the industrial sector or the political sector, all of them pointing to the lack of competitiveness. Real exchange rate changes, and hence monetary policy, can affect nominal exchange rates. Ergo, it becomes the responsibility of the Central Bank to deal with competitiveness. Thus there are multiple implicit objectives, and none of them is achieved.

I think that once you are inflation targeting, this is the true anchor, because you operate through expectations. And if you operate through expectations, if you have credible inflation targeting, you can allow the exchange rate to be determined at the correct level. The responsibility for its value also rests in the market, which is where it belongs. I would say that the ability to achieve sustainable disinflation, or maintenance of low inflation, in countries with legacies like those of which we have been speaking, rests on ensuring that the Central Bank can focus on what it does best.

I notice in Domingo Cavallo's remarks something very interesting—a new twist, as far as I can see. In the world of two corners, which says that you have either completely fixed (meaning "throw away the key" and adopt foreign currency, or the equivalent thereof) or completely floating, you appear to have a symmetric choice. For Cavallo, though, what is truly the long-run state is flexibility. You must first gain entry into the Darwinian competition by having credibility acquired through long-term price stability. If it is acquired through currency purchases, so be it. However, when the purchased currency moves into a flexible rate regime, this is not a collapse but, rather, a graduation. And I think that lifting the anchor is part of the anchor strategy. If you don't have a very well defined mechanism to lift the anchor without losing credibility, you had better not start using the anchor but, instead, leave it wherever it belongs.

On capital controls, Edwards has made some remarks, talking a bit about the Chilean experience. It is no accident that the Chilean experience is always mentioned, because it failed dramatically in many, many cases. At least in Israel's case, where we tried to impose capital controls, we learned very well that "water seeps through the cracks." You really cannot have long-term capital controls.

Let me mention here the moral hazard problem. When a government is committing itself to a nominal exchange rate—that is, pegging—it enters into an implicit contract with the industrial sector. And many, many times, when we need to change the peg, we again face the industry saying, "you broke the rules of the game. We planned according to what you promised us, and now you're changing the exchange rate." Obviously, this means that if an exchange rate needs to be changed, it always will have to be a little later than when it is required; and if it is a little later, then we are back to the problems that were mentioned earlier.

The same is true for intervention. In order to succeed with intervention, you had better be able to stabilize. In order to succeed with stabilization, you had better be able to manage the quantities at hand. If indeed the environment is an open capital account, there is simply no way that you can do it successfully. I remember very well the 1998 crisis, when the appetite for investment in emerging markets declined after Russia and other problems: everyone wanted to cash in their emerging markets holdings. Suddenly, on the same day, all finance ministers and governors in practically all emerging markets felt the same mechanism: investors wanted to cash out and leave the country with the pressures of the foreign exchange market. Basically, we had three choices. One was to intervene and prevent the exchange rate changes that were actually about to occur. Another was to close the window: put in capital controls or something of that type. Third, we could allow the exchange rate to adjust, not because we loved that option, but because we had no other choice but to use monetary policy very fiercely in order to deal with the inflationary consequences of the exchange rate

change. The reality was that when the exchange rate depreciated, we noticed what the inflationary consequences were likely to be. That's when we raised interest rates. That's when we ended up with this type of scenario. What was the outcome? We raised interest rates quite dramatically, and within an extremely short period of time—we are talking about weeks—the process reversed itself, and someone looking before and after could not see the difference. As a matter of fact, exactly in the period when emerging markets contemplated imposing controls, we publicly eliminated the final traces of controls, making the point that, indeed, our markets are open. Indeed, it was no accident that when money left emerging markets, it came to us. But we *were* emerging markets, and therefore we realized that the concept called "emerging markets," which is based on a color-blind investor, is also part of the past. The countries are involved in beauty contests, and selectivity is the name of the game. It is not the exchange rate regime that will carry the day in these beauty contests, but rather the ability to carry out the right economic policies.

What did we see at the end of the day? We saw that the Phillips curve can be positively sloped, that inflation is now holding solidly enough for two years in a row at the range of 1.5 percent. Growth this year is about 6 percent, and basically this is the payoff for the period of slow growth from before. The fact is, however, that the credibility of monetary policy has been enhanced very strongly. Now you can say, well, that's an esoteric objective for a monetary policymaker, to have credibility. But that's not true, because with this enhanced credibility, the credibility of the inflation-targeting strategy also has been enhanced, and thus the pass-through from exchange rates to prices disappears. In the past, countries with inflationary legacies knew that whenever the exchange rate changes by 5 percent, prices at home would change by 5 percent immediately. And because you know that will happen, the markup occurs instantaneously, and that is basically the self-defeating mechanism of "flexible exchange rates." However, in the inflation-targeting approach, the monetary authorities have the credibility that they will not allow the inflation consequences of the exchange rate to take place, because they use interest rates properly. Then there is no reason that when the exchange rate changes, one is wiped out from its real implications of inflationary changes. This is the case because the inflation will not take place, since everyone knows that it will not be allowed. Therefore, what we have noticed is that when there was a depreciation of the currency, it did not mark the start of inflation and real exchange rate changes, but, rather, it marked the start of improved competitiveness. Suddenly, in this regard, what you observe is that the disinflation process has been accompanied by enhanced rather than declining competitiveness.

Let me conclude by noting one more general statement: If the environment within which we operate is one of capital markets that are integrated, then one implication is that time passes very quickly because this mecha-

nism enables what one anticipates will happen tomorrow to instead happen today through the capital markets. This means that the distinction between short run and long run is getting blurred; all the policy debates and justifications for short-run policies that are not sustainable in the long run cannot stand any more, because the long run is much closer than it used to be. Thus, we have stabilization policies that are not sustainable in the long run and should not be started in the short run. So, although I am not dogmatic about the notion of a "don't be in-between regime," because I realize that you cannot jump to a corner in one day, I do say that it is important to notice where are you going to gravitate, and to recognize that this is a graduation from where you are now; and if it is a graduation, then the movement is not reflecting a collapse and loss of credibility but, rather, progress and a gain in credibility.

Discussion Summary

Guillermo Ortiz began on the theme of whether floating rate regimes are feasible for emerging markets. He recalled that when Mexico began floating in 1995 it was not because the government had studied exchange rate models and decided that the optimum regime was a float. Instead, the country had completely run out of reserves and had no choice but to let the exchange rate go. At the time he felt a float was not a feasible long-term policy. In his capacity as minister for finance he wrote a blueprint for economic policy in early 1995 called the National Development Plan. This plan stated the intention to return to a more predictable exchange rate regime once enough reserves had been accumulated.

Why was the government so afraid the float would not function well? Ortiz said that they had no prior experience with floating and believed that the exchange rate would be unstable. Mexico lacked institutional prerequisites such as a futures market and the capacity to conduct an independent monetary policy. The actual experience has been much more positive than expected, however. First, futures markets have been established domestically and in Chicago, and the volatility of the exchange rate has been comparable to the experience of other floaters. Second, the rate has also changed the composition of capital flows, with 80 percent now being foreign direct investment and 20 percent portfolio investment—the reverse proportions of what Mexico had before. Third, it has allowed Mexico to grow at an average of 5.5 percent in the five years after the crisis. He said he is now "fully converted to this world of floating rates."

Ortiz then turned to the question of whether Mexico is "really floating." To provide an answer, he suggested that we look at how Mexico is conduct-

ing monetary policy. Mexico adopted inflation targeting in 1998. He said that the authorities are constantly grappling with the "leaning against the wind" problem posed by Arminio Fraga. He concluded, however, "that the real object of the Central Bank is to get inflation down," adding that in doing so "we do look at exchange rates but we don't worry too much about exchange rates."

Continuing on the theme of "fear of floating," Ortiz drew a distinction between fear of volatility and fear of misalignment. He said, "volatility is something we can live with," adding that the authorities should pursue policies that reduce volatility, not policies that suppress it. On the misalignment question, he said you must believe in the market to align a misaligned exchange rate.

Sounding a more negative note on freely floating exchange rates, *Paul Volcker* observed that in an integrated capital market the foreign exchange market responds like an asset market, and asset markets are inherently volatile. Volcker said he is not too concerned about day-to-day or month-to-month volatility, but about something that comes close to what Ortiz called misalignment. He pointed out that the major economies had "misalignments" of 50 percent running over periods of a couple of years under floating rates. Volcker asked if this is consistent with the efficient international division of labor that we learn about in the textbooks. He said that we learn about the importance of prices and comparative advantage, but when we see the exchange rate move by 50 percent over two or three years, we say, "who cares?" Whatever the impact on large economies, Volcker thinks that such volatility has a big impact on smaller economies. Close to 90 percent of transactions take place with a fixed exchange rate in large economies such the United States and Euroland. Smaller, more internationally open economies are much more exposed.

Turning to what to do about this volatility, Volcker said that if you are going to have open capital markets, the ultimate logic of an efficient international system is a single currency, but he added that he doesn't expect to see this in his lifetime. Regarding the small emerging market economies, he asked if there are intermediate approaches. He recalled Arminio Fraga's point about confusion under pegged rates, adding, "you can't be any more confused than me about the current floating regime." Addressing Guillermo Ortiz, Volcker pointed out that although the Mexican government might be happy with the floating peso, Mexican businessmen say they want him to convince the Mexican government to adopt the dollar to bring about some certainty.

Volcker finished with the stark prediction that Mexico will adopt the dollar after one more big currency crisis, adding that he is "convinced that within a decade we will have such a crisis, judging from experience." *Sebastian Edwards* said that Mexico will adopt the dollar when it becomes truly integrated with the United States, and he joked that that will not happen be-

fore the United States has at least one major league baseball team operating in Mexico. *Volcker* noted after the meeting that he had been working toward precisely that aim with the commissioner of major league baseball!

Takatoshi Ito commented on the debate going on in Asia about the appropriate exchange rate regime now that there has been a successful recovery from the crisis and foreign reserves have been built back up. He added that there is some indication that Asian economies are again pegging to the dollar. They are going back to a de facto dollar peg that many consider to have been mistaken. As an alternative, he said, "many of us" are advocating an intermediate regime for Asia, especially the basket band crawl (BBC) proposed by John Williamson. The basket idea makes sense because of Asia's diversified trade structure. The proposal is to give one-fourth weight to Japan, one-fourth to the United States, less than one-fourth to Europe, and slightly more than one-fourth to neighboring non-Japan countries. The band and crawl are needed to have the flexibility to respond to supply shocks. Ito pointed out one problem with getting such a regime established: if your neighbor is adopting a de facto dollar peg, you will want to do likewise, given the strong trade links with neighboring countries. For this reason there has to be a joint decision to adopt the basket system, Ito said.

On the issue of confusion and temptation in intermediate rate systems, Ito said that Asian countries did not have the hyperinflationary experience suffered elsewhere. Thus, even after the crisis the populations have more confidence in their central banks. Temptation can be controlled by International Monetary Fund (IMF) surveillance and peer pressures within the region. Ito concluded by saying that the details of intermediate regimes should be explored rather than dismissed out of hand.

In response to a request for clarification, Ito agreed that this proposal was for Asian countries other than Japan.

Lin See Yan addressed what he regarded as the unfair treatment of Malaysia as a pariah following its imposition of selected capital exchange controls. The Malaysian case must be viewed in the context of its critical need to maintain stable growth with equity, given the vast differences in race, culture, religion, language, occupation by race, and economic status of its diverse population. To keep racial, social, and religious tensions at bay, "the economic pie" has to grow in a sustainable fashion, he said. Malaysia has been remarkably stable following this strategy for the past thirty years. In the early months, things even looked good as the crisis persisted. The managing director of the IMF praised Malaysia's management of the economy shortly before and for months after the crisis. Once the controls were instituted, Lin complained, he was saying that Malaysia was the worst country in the world. Lin went on to describe the devastating impact of sharp exchange rate volatility, large outflows of portfolio capital, and the exceptionally deep fall in stock market prices on businesses and expectations in a small open economy such as Malaysia. Not even a reasonably well

managed and well structured economy like Malaysia could withstand, within a very short period of crisis, a 40 percent devaluation of its currency and a 60 percent diminution of its stock market capitalization at a time when the region was engulfed in panic, euphoria, and contagion, without any reasonable prospect of an early recovery. He concluded by saying that the adoption of a reasonable exchange rate regime for any economy must take account of its specific circumstances, in particular the political and social mission of public policy. With hindsight, timely intervention to reestablish stability enabled Malaysia to avoid the political and social unrest experienced by the other crisis-affected nations, notably Indonesia.

Jeffrey Frankel observed that it is remarkable how the "corners hypothesis" has become conventional wisdom five years after if was first proposed following the exchange rate mechanism crisis. What is especially remarkable, he said, is that it has become so widespread without much of a theoretical justification. Various justifications have been mentioned—the impossible trinity, the danger of unhedged dollar liabilities, procrastinating on exit, and the difficulties of transparency and verifiability. However, if you look at each of these in detail, none of them can be written down in a model with the result that you want to go to either a firm-fixed or freely floating corner. Frankel added that each captures a difficult trade-off, but the trade-off does not go away when you go to a corner.

Sebastian Edwards commented on the difficulty of measuring exchange rate misalignment. He pointed out the large differences that exist between the major financial institutions'—Goldman Sachs, JPMorgan, and Deutsche Bank—estimates of misalignments in Latin American economies in early 2000. The models, he concludes, need to be improved. Regarding the debate about the corners hypothesis, he said he agrees with Frankel that it is amazing how popular it has become with essentially no model. As a profession, we have ruled out the middle because it has not worked well in the last five years, without taking a longer historical perspective. Edwards also thinks that we are being naïve about the political difficulties of going to either of the two corners. Most countries will be in the middle, and so, from a technical point of view, we must work on rules to make managed regimes less prone to crisis.

Arminio Fraga predicted that there will be gravitation to the extremes. Based on what he has heard about the Asian experience, he concludes that it takes a lot of virtue to run an intermediate regime. It can be done, he said, but it is risky. He prefers systems that are less demanding of virtue.